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SOCIOECONOMIC ISSUES OF HEALTH 1980

Douglas E. Hough
Glen I. Misek
Editors

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Foreword

This is the ninth annual edition of *Socioeconomic Issues of Health*. This volume and its companion, *Profile of Medical Practice*, are intended as quick reference guides for use by health professionals, policymakers, researchers, and journalists. Each brings together in one convenient source a combination of relevant essays and current data concerning the health care delivery system. Data included in *Issues* are abstracted principally from private and government sources; the data in *Profile* are collected primarily by the American Medical Association. Papers contained in each book include the contributions of authors from the research community at large as well as health researchers within the Center. The views expressed in the articles are the author's interpretations of the issues discussed and are not intended as statements of AMA policy.

The Center for Health Services Research and Development trusts that this edition of *Issues* will be useful to all individuals with a general interest in the socioeconomics of health.

Lynn E. Jensen, Director
Center for Health Services
Research and Development
American Medical Association

Introduction

It has been argued that health care is "different" from all other industries. Nowhere is this more evident than with regulation: whereas the trend in many industries is toward less government control and greater promotion of competition, the opposite seems to be true of health care. It is important, therefore, to investigate whether or not this regulation has succeeded in moving the health care system toward its goal of efficiency plus high quality care. With this objective in mind, the six articles in this year's edition of Socioeconomic Issues of Health address this issue in several contexts and examine the consequences of health care regulation.

Robert A. McLean sets the stage for this discussion in his paper, "Regulation of the Health Care Marketplace: A Review of the Issues." McLean focuses on the benefits and costs of regulation and reviews the three competing theories of regulation: the progressive (or public interest) theory, the capture theory, and the political economy theory. He uses this framework to evaluate three examples of government "intervention" in health care: occupational licensure, Certificate-of-Need (CON) controls, and hospital rate review.

Kenneth M. McCaffree and Thomas W. Bice, in "The Impact of Capital Expenditure Controls on Health Care Institutions," review the justifications for placing capital expenditures and services controls (e.g., CON laws) on hospitals. They then apply these arguments to other health care institutions, particularly nursing homes. They conclude that nursing homes possess few of the market characteristics that justify such controls.

A management-oriented approach to health care regulation is provided by David A. Dittman in his paper, "Health Care Regulation via PSRO: The Management Control System of Concurrent Stay Review." Dittman places Professional Standards Review Organizations (PSRO) within the context of a hospital's organizational structure and evaluates the probable impact of this form of continuous regulation.

Although its arguments encompass far more than simply regulation, Patricia Munch's paper, "Economic Incentives to Order Lab Tests: Theory and Evidence," offers trenchant insights into the consequences of various regulations on a physician's behavior regarding the number, kinds, and location of laboratory tests he may order for his patients. Munch concludes from her regression analysis that physicians do respond to economic incentives in this area and that government involvement in reimbursing or controlling laboratory tests plays a significant role in this process.

Harold S. Luft and Jon B. Christianson and Walter McClure complete the article section of this year's Socioeconomic Issues of Health with a quasi-debate over the impact of Health Maintenance Organizations (HMOs) on health care costs and the consequences of government regulation on the success or failure of HMOs. Luft, in "HMOs and the Medical Care Market," outlines four models that have been proposed to analyze the influence HMOs have on the competitive environment (and, thus, on costs and prices) within the health care industry. Because of the fragmentary evidence available, he finds none of the models convincing. This ambiguity leads him to advocate a strategy of government encouragement of HMOs in particular and of a combination of regulatory and market approaches to the health care sector in general.

Christianson and McClure implicitly counter Luft's conclusions in their paper, "Developing a Regulatory Strategy Consistent with a Competitive Health Care System." They claim that government policy effectively has stymied HMO development, arguing that "a comprehensive pro-competitive regulatory strategy for medical care has never been implemented." Consequently, Christianson and McClure offer such a strategy, one that integrates regulation with a sustained development of competitive markets.

In the second part of the book, Socioeconomic Issues of Health 1980, as in earlier editions, presents a variety of socioeconomic data on health and health care. Fifty-three tables and twenty-five figures detail information on: the characteristics of the U. S. population (including mortality and morbidity statistics), characteristics of the health services delivery system, national health care expenditures, financing mechanisms for the provision of health services, and medical education and medical manpower. These data will provide health care professionals, policymakers, and researchers with a readily available source of accurate and timely summary information on health and health care.

In total, the editors believe that the ninth edition of Socioeconomic Issues of Health offers our readers two things: a set of useful health care data, and a collection of thoughtful articles representing a broad spectrum of analysis on the issues of regulation of the health care sector. Although we may not agree with some of the opinions expressed by the authors, we cannot quarrel with the quality of their reasoning or of their presentation of the issues. We hope that our readers will feel the same.

Finally, the editors wish to acknowledge a number of people within the AMA's Center for Health Services Research and Development whose efforts on this volume could not have helped but to improve its overall quality. First, we wish to thank Helen M. Enos for compiling the index and collecting the voluminous amount of reference material necessary to complete this edition. Second, we thank Arsenio Oloroso for his considerable efforts in coordinating the actual production process. Last, we are grateful to Lynn E. Jensen, Director of the Center, and Jack L. Werner, Director of the Department of Health Systems Research within the Center, for their helpful comments and advice.

Douglas E. Hough
Glen I. Misek
April 1980

Note to Prospective Authors

Socioeconomic Issues of Health seeks to provide a forum for policy-related research pertaining to the health care system. Authors who wish to submit an article to be considered for inclusion in the tenth edition of Socioeconomic Issues of Health should send a brief abstract no later than October 1, 1980 to:

EDITOR
Socioeconomic Issues of Health
Department of Health Systems Research
Center for Health Services Research
and Development
American Medical Association
535 North Dearborn Street
Chicago, Illinois 60610

The editor will respond to the abstract and send the author a copy of the style sheet for Socioeconomic Issues of Health. Three complete copies of the paper must then be sent to the above address by December 31, 1980. Manuscripts will be submitted to referees and the author will be informed of the decision shortly after the receipt of the paper.

Part I
Selected Papers

Regulation of the Health Care Marketplace: A Review of the Issues *by Robert A. McLean**

INTRODUCTION

The purpose of this paper is to outline the public policy issues surrounding the regulation of the health care industry by various levels of government. The circumstances that have given rise to demands for increased government intervention in the market for health care are so well known and so often enumerated that listing them here would be redundant. The rapid increase in the proportion of Gross National Product devoted to health care is but the most often cited of several factors that have led many to suggest that government should exercise greater direct control over the health services industry.

The main point argued here is that the outcomes of increased regulation would not be unambiguously in the public's interest. This paper discusses theories of the regulatory process which suggest that many forms of regulation serve the interests of the regulated. Further, several specific regulations are evaluated and alternatives to regulation discussed.

THE LOGIC OF REGULATORY INTERVENTION: THE PROGRESSIVE TRADITION AND ALTERNATIVES

For the purpose of this paper, regulation is defined as any government control over the way private markets function. Thus, it does not include the role of government as a seller and/or purchaser of goods and services, nor does it include most tax collection.[1] Of particular importance to the arguments presented here, regulation does not include the payment by government for services purchased by private parties, as through Medicare and Medicaid. Two forms of intervention remain within the definition of regulation: interventions to restore competition to the market, and interventions to supplant the workings of the market.[2] Neither of these two forms of government intervention is new in the United States (Hughes 1977; McCraw 1975).

The traditional approach to the study of regulation (dating from the Progressive Movement of the early 1900s) assumes that government interferes with private markets when it is in the public interest to do so. Thus, market-restorative regulation is justified when one or

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*Robert A. McLean, Ph.D., is Assistant Professor of Business Administration, University of Kansas. The views expressed in this paper are those of the author and do not necessarily represent the official policy or position of the American Medical Association.

[1] Many government purchases, however, are conditioned by regulatory compliance. Acceptance of a government contract, for example, requires adherence to affirmative action regulations.

[2] For analytic purposes, this dichotomy is preferable to Krause's (1975) trichotomy of controls on people, places, and prices.

more of the conditions necessary for efficient market allocation is violated. Bator (1958) has outlined the general conditions under which markets generate inefficient allocations.[3] For the evaluation of the health care marketplace, two of these sources of "market failure" are of special interest: the presence of external effects (Bator's "failure by enforcement") and the violation of the conditions of workable competition (Bator's "failure by structure").

In the provision of health care, there are often benefits accruing to or costs imposed on persons other than those involved in the purchase of the service. These are known as external benefits and costs. Inoculations, for example, confer benefits not only on the consumer, but also on others to whom he might otherwise transmit disease. Private markets may provide "too few" inoculations because the consumer fails to include the benefits to others in his decisions. In the United States the need for regulation of private markets in such cases has been obviated by providing public health services through the public sector. On the other hand, the presence of health insurance may create external costs and cause private markets to provide "too much" medical care. Since the consumer bases his choices only on the direct costs to himself, insurance may lead him to ignore the impact of his decisions on the costs of health care to others.

Among the conditions of workable competition violated in the medical marketplace is the provision of full information on product price and quality. In other markets, "truth in lending/advertising/packaging" regulations have attempted to correct for this source of market failure. In the medical care marketplace occupational licensure has been justified by those accepting the progressive tradition as fulfilling this need.

Under market-supplantive regulation, the second form of government intervention, the role of a private market per se is judged to lead to inefficient outcomes, decreasing social welfare. Thus, the progressive tradition asserts, the public interest is served by the introduction of some form of "command and control" mechanism (McClure 1979). Public utility regulation is the most familiar example.

Recently, the progressive tradition has been challenged by two alternative approaches to the study of regulation: the capture theory and the political economy theory. (Compare, for example, the views expressed by Priest (1970) on the desirability of public utility regulation of hospitals to those of Havighurst (1973).) The capture theory (MacAvoy 1970) asserts that regulatory agencies are captured by the interests of the industries they regulate. Thus, for example, capture theorists assume that regulation of the health care industry will always operate in the interests of health care providers, as they are the group who are assumed to have gained control of the regulatory bodies (Feldstein 1977). Even at the height of regulatory fervor, analysts recognized the close relationship of the regulators and the regulated (Irish and Prothro 1968, pp. 481-483). The capture theory of the regulatory agencies, rejected by many as overly simplistic and as neglecting the role of checks and balances in government, followed naturally from that realization.

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[3] Bator makes extensive reference to an earlier article (Bator 1957). The reader should consult Sections I and II of that paper prior to the 1958 article. Wolf (1979) provides a less technical discussion of the conditions leading to market failure.

More recently, students of the economics of regulation have adopted a "political economy" approach to the study of goverment intervention (Stigler 1971; Peltzman 1976). According to this approach, regulators are servants, not of the interests of the regulated or of the public, but of their own self-interest. Thus, they will act to maintain themselves in office, this goal being served by acting to gain maximum political support. The interests of the regulated are concentrated on those issues under the purview of the regulatory authorities, while the interest of the consuming public is diffused over many issues. Thus, in the majority of their actions, it is in the interest of the regulators to serve the interests of the regulated. It is from this view of regulation that much of the recent critique of government intervention has sprung (Posner 1974).

It is important that the highly publicized attack of regulation by business leaders was not a major factor leading to the current critique by economists and students of public policy. On the contrary, the prevailing critique of regulation embodied in the political economy approach takes issue with the business community's central point, that regulation hurts business, thus reducing total output. Rather, the political economy approach was pioneered by members of the "Chicago School" of economics (Peltzman, Posner, Stigler) who have long championed the efficiency of unregulated markets. The political economy approach has begun to prevail among students of public policy because its basic assumption (that regulators serve their own self-interests) has wider acceptance than that of the capture theory.

BENEFITS OF REGULATION

Although the political economy approach has begun to dominate the study of the motives for regulation, it is on the basis of the benefits and costs to the public that any specific intervention must be evaluated.[4] Specific regulations may have many objectives, but one can classify the benefits of regulation into four categories: increased efficiency due to change in market structure, increased efficiency due to internalization of costs, the control of costs, and increased equity in the distribution of outputs.

The first of these benefits of regulation refers to the correction of what Bator called "failure due to structure." Regulation can be introduced to restore one or more of the conditions of workable competition (Scherer 1970, Ch. 17). To the extent that such regulations are successful, output will be increased and market price will decline. Regulations prohibiting monopoly, increasing consumers' access to accurate product information, and prohibiting unfair trade practices promise such benefits.

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[4] Policy evaluation is a highly technical field, beyond the scope of this paper. Mishan (1976), Stokey and Zeckhauser (1978), and Weiss (1972) provide excellent discussions.

Regulations requiring firms to bear external costs attempt to alleviate Bator's "failure due to enforcement." That is, they seek to promote socially optimal quantities of output by forcing producers to base their calculations on all costs of production, social as well as private. Product safety, industrial safety, and pollution control regulations often are supported on this basis. Cost control regulations, which are typical of the public utility industries, seek to control the cost of production when private markets offer little incentive to do so. Thus, they offer the benefit of reduced market price.

Finally, some regulations are introduced to provide greater fairness in the distribution of output. The justification for such regulations must necessarily rest on the value judgment that the unregulated market outcome will leave some group undersupplied with some output that it deserves to receive. Price controls (especially on "necessities") are often instituted for this purpose.

FACTORS FRUSTRATING REGULATION

Several factors may cause specific regulations to fail to deliver the benefits that their proponents envision. The most obvious is that of inappropriate means. Regulations are often framed without full consideration of their effects. Many economists, for example, have argued that the imposition of a minimum wage is an inappropriate means toward the goal of reducing poverty. Thus, the promised benefits of minimum-wage legislation, they contend, have never been realized.

Another source of frustration in deriving benefits from government regulation of private markets is embodied in the "problem of the second best" (Lipsey and Lancaster 1956-1957; Markovits 1975, pp. 967-983). The theory of the second best implies that if one or more of the conditions of perfect competition cannot be satisfied, then there may be no welfare gain from a policy that seeks to satisfy only some of the remaining conditions. The conditions of perfect competition are so restrictive that some scholars suggest that the problem of the second best limits the usefulness of almost all market interventions.

Further limitations on the benefits of regulation are described by Wolf (1979) in his discussion of what he calls "non-market failure," that is, the failure of non-market institutions to allocate scarce resources efficiently. The first of these is the existence of private goals of regulators that may conflict with stated goals. Such private goals may include budget growth, unnecessary technological advance, and information control. The second contributor to non-market failure is the inefficiency in program management, leading to rising costs. Wolf's third factor is the existence of unintended side effects from regulation that may confound intended benefits. Finally, Wolf cites distributional inequity: the benefits of regulation tend to be distributed on the basis of political power rather than actual need. There is no guarantee that the power to win the benefits of regulation will be in the hands of those for whose benefit any given regulation was originally intended.

THE THREE DIMENSIONS OF REGULATORY COSTS

That government regulation of private markets involves costs should be no surprise. The progressive tradition of regulation holds that one of the principal purposes of government intervention is the imposition of external costs on private parties. The dispute among adherents of the three competing theories of regulation concerns who bears these costs and who receives the benefits that may accompany them.

The costs of regulation can be classified into three categories: static, dynamic, and equity. Static costs are those that result from an inefficient allocation of resources and losses of output in the short run. Regulation may impose such costs on the regulated industry, leading to reductions in welfare for producers and consumers alike. There are many familiar examples of the static costs of regulation. Price ceilings are known to generate shortages, necessitating some form of non-price rationing (as in the case of recent gasoline lines). Averch and Johnson (1962) demonstrate that, because it bases revenue on capital stock, public utility rate regulation leads to the use of inefficiently large capital/labor ratios. Many economists argue that safety standards mandated by the Occupational Safety and Health Act of 1970 require increased costs of production (and, thus, higher prices and reduced output) without any demonstrated effect on injury rates.

Dynamic costs are those that result in losses of output in the long run. In particular, it has been argued that government regulation reduces the rate of technological change. In the health care industry, added costs of introducing new products and processes (due, for example, to product safety regulations) have been blamed for reducing the rate of innovation (Peltzman 1974; Wardell and Lasagna 1975). Reducing the rate of innovation reduces consumer welfare not in the current period, but in those future periods in which new products and techniques would otherwise have been available.

Finally, there are equity considerations involved in any regulatory scheme. One must recognize that redistribution of wealth is a consequence of any intervention and that the desired and undesired equity effects must be calculated. The progressive approach holds that the intended direction of redistribution of most regulatory schemes is toward the consuming public and away from the owners of regulated capital. Thus, adherents to the progressive tradition view such redistribution as a benefit of regulation. The political economy and capture theories postulate a different redistributive effect. They maintain that the effect of most regulatory schemes is to shift wealth away from the public and toward the regulated industries and individuals. Thus, adherents to these two views of regulation view regulatory redistribution as a cost.

THE HEALTH CARE INDUSTRY AND THE PROGRESSIVE MODEL OF REGULATION

Before discussing specific regulatory schemes in the health care industry, one issue remains to be examined: the extent to which the health care sector conforms to the progressive model of an industry in need of government intervention (that is, the extent to which regulation can be justified as in the public interest).

In principle, the public utility/natural monopoly model applies to industries that are "clothed in a public interest" and in which the efficient scale of operation is so large that only one (or a few) firms can serve a population efficiently (Scherer 1970, Ch. 22). Public policy acknowledges this situation by limiting entry to one (or a few) firms, requiring those firms to serve all customers, and guaranteeing firms a fair rate of return to their capital. Two sectors of the health care industry conform to this model: the hospital industry (defined to include long-term care facilities) and the public health industry (sanitation, preventive medicine). Public health services already are publicly provided, and thus need not be of concern here.

The hospital industry conforms to this model in several ways. First, even though there is some dispute as to the minimum efficient size of a hospital, it seems to be large enough that most communities can be served by only a small number of efficient hospitals.[5] Havighurst (1973) suggests that there is a natural tendency toward oligopoly (few firms) in the hospital industry, while others (Priest 1970) would limit entry as a matter of public policy.[6] A second factor making hospitals fit the public utility case is the manner in which they are reimbursed. Cost-based reimbursement, analogous to the public utility case, has been accepted by most private insurance carriers, as well as by public reimbursement authorities. Indeed, debates as to reimbursable costs (should, for example, bad debts be allowed in the cost base?) are analogous to debates over the capital base in public utility rate setting.

At the level of the primary medical care provider the public utility model is unsuitable as a justification for regulatory intervention. Rather, the widely perceived failure of the market to conform to the tenets of workable competition is frequently used to justify regulation in this market. One often-cited cause of this failure is an alleged lack of information available to consumers (Pauly and Satterthwaite 1978). While the competitiveness of the market for physicians' services is a subject of debate (compare, for example, the findings of McLean (1979) to the discussion in McClure (1979), information-augmenting regulation has been enacted in the guise of professional licensure in every state, with a stringency that appears to be increasing over time.

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[5] Berki (1972) reviews several studies indicating a wide range of estimates of optimal hospital size.

[6] For additional discussion, see Drake and Kozak (1978).

EVALUATION OF SELECTED INTERVENTIONS

Occupational Licensure

The licensure of health providers is the most pervasive form of government regulation of the health care industry in the United States. Every state licenses physicians as well as osteopaths, dentists, and nurses (Department of Statistical Analysis 1979, Appendix). Occupational licensure was introduced quite early (Stigler 1971, p.15) and has not met any serious challenge from the professional societies representing the licensed professions (Shyrock 1967).

The articulated goal of licensure is the correction of one source of market failure in the health care industry: lack of consumer information as to product quality. It is, indeed, on the basis of licensure's success toward meeting this goal that one recent analyst has defended it (Leffler 1978). Leffler argues that licensure-based restrictions on entry into the health care professions reflect the desire of each state's citizens for protection from the consequences of patient ignorance as to quality. Thus, according to this view, interstate variations as to the strictness of licensure requirements reflect, according to this view, variations in the demand for protection.

A long tradition in economics, predating the development of the political economy approach to the study of regulation, views licensure quite differently. This view holds that licensure serves the interests of health providers by restricting the supply of professional services and, thus, increasing their price (Friedman and Kuznets 1954; Maurizi 1974; Moore 1961; Rottenburg 1962; Shepard 1978; Thornton and Weintraub 1979; White 1978). Maurizi, for example, offers an alternative to Leffler's interpretation of interstate differences in licensing requirements by finding support for the hypothesis that licensure requirements are more stringent in those states in which incumbent practitioners have the most to gain from the exclusion of potential entrants. Pauly, introducing some balance to the argument, has suggested that supply and demand, rather than one of the factors acting independently, jointly determine the severity of licensure requirements (unpublished comment, Allied Social Science Associations meeting, Chicago, August 1978).

Apart from the general restriction on entry into the health professions that licensure erects, the interstate variation in the stringency of licensure requirements may generate another source of misallocation of resources: a reduction in the geographical mobility of professionals. This reduction in mobility makes the migration of professionals to areas of excess demand more difficult than it would be in the absence of interstate variations in those requirements. Among the scholars finding a misallocation effect due to the impact of licensure on mobility are Holen (1964), Kleiner et al. (in press), and Pashigian (1979).

To avoid the misallocation that licensure is generally believed to generate, many economists have supported the abolition of licensure and its replacement by certification. Under certification, anyone could enter any health profession (thus, increasing the supply of services offered), each state certifying the degree of skill of each practitioner (thus, remedying the consumer ignorance problem).

One might conclude that licensure produces mixed results, causing a reduction in the supply of (and, thus, an increase in the price of) health services, but correcting the problem of consumer ignorance as to product quality. One argument remains to be explored in the research literature, however. Licensure may actually reduce the amount of consumer information extant. By conveying to the consuming public the impression that all licensed professionals are highly skilled, licensure reduces consumers' incentive to search for further information. It is not clear that licensed professionals are of uniformly high quality, only that they were, at one time, all able to pass a standard examination.

Certificate-of-Need

The manner in which most third parties (insurance carriers, Medicare, and Medicaid) reimburse hospitals for the services they provide generates the same incentives to overinvest in physical capital evident with the regulated utilities. Hospitals are typically reimbursed according to some "cost-based" scheme. Thus, the higher is the cost of services produced per patient day, the greater will be the reimbursement allowed to the hospital. In not-for-profit hospitals, profit generated by the inflation of costs is not a concern of the administrators. However, the demands of medical staffs for high quality facilities often prompt the hospitals to maintain costly stocks of equipment. Under cost-based reimbursement, the hospital has the means to maintain such stocks. The higher is the cost of the hospital's capital stock, the greater will be the reimbursement allowed by third parties under the cost-based schemes. Thus, even in the not-for-profit sector, hospitals have the same incentives to "overinvest" (and, thus, to increase cost per patient day) that exist for public utilities.

Certificate-of-Need (CON) legislation, motivated by Section 1122 of the 1972 Social Security Amendments, has been adopted by a majority of the states. Under CON, all capital acquisition made by a covered provider must be approved by a public authority empowered to grant such certificates. Usually, only hospitals are covered, but a growing number of states cover physicians' offices as well. Actions requiring approval include additions to existing capital stocks costing more than some minimum amount (the minimum varies widely among states) and the establishment of any new facilities.

Although the stated objectives of CON regulation are to reduce the tendency to invest in excess capacity and to aid in the development of area-wide planning, closer inspection suggests an alternative interpretation: that of restriction of entry into the market (Havighurst 1973; Wendling and Werner 1979). Using the political economy approach to the study of regulation, Havighurst contends that, by preventing new competitors' entering the market and underpricing current competitors, CON legislation allows existing not-for-profit hospitals to continue to price services so as to subsidize unprofitable activities. That is, in the absence of competition from new providers, hospitals are able to price some services above average cost, so that these services can subsidize the provision of services used so infrequently that they cannot earn sufficient revenues to support themselves. The cartelization of the market by existing hospitals allows them to continue this inefficient cross-subsidization. Such behavior, taxing part of the public to support services for another part, is sometimes cited as a common outcome of regulations (Posner 1971).

Problems of cartelization of the hospital industry are not the only undesired outcomes that have been suggested as flowing from CON legislation. In those states in which some kinds of providers (physicians' offices) are excluded from coverage while other kinds (hospitals) are not, CON may not reduce total investment, but may only shift investment from the covered sector to the uncovered sector. That is, office-based physicians may find that, if they cannot obtain capital in the hospitals in which they have privileges, they can add such equipment to their office capital. Inefficiency is then compounded, as any one physician's office practice is often too small to use major capital at optimal capacity.

A related problem is that uncovered providers are shown an implicit preference over covered providers when the two offer competing services. For example, hospital-based medical groups may have additional costs in their practices that are not present in those of office-based physicians because of hospital-specific CON regulation. Among these costs are the need for record keeping and case presentation that are not imposed on providers in uncovered settings.

Whether one believes that the outcome of CON will be to reduce costs to consumers through the restriction of excess capital acquisition or to increase costs to consumers through the protection of inefficiency or the insulation of the office-based physician from competition, CON can only have an effect on the cost of medical care if it does, indeed, alter investment in health care facilities. The available evidence leads one to question the magnitude of such an effect. Hellinger (1976a) and Wendling (1978) both found CON legislation to have no significant effect on hospital investment. Salkever and Bice (1975, 1979) found CON to decrease investment in beds, but to increase investment in assets per bed, and thus to increase costs per patient day.

Hospital Rate Review

If CON legislation introduced utility-like regulation to the hospital industry, the transition of the hospital industry to the status of a public utility has been completed in those states that have chosen to implement prospective rate review. Under prospective rate review, some "allowable" annual cost for a base period is determined by the rate-setting authority. The total cost is then divided among the services provided (the issue of cross-subsidization will inevitably be an issue in this process) and allowable rates of reimbursement for subsequent periods are determined. The process is a direct application of public utility rate determination (Kahn 1970; Scherer 1971).

The evolution of the rate-setting process in these states has been reported by several researchers (Berry 1976; Cohen 1974; Hellinger 1976b; Zimmerman et al. 1977). The success of such legislation in reducing the rate of increase in hospital rates has been difficult to determine, but some researchers claim success (Cohen and Cook 1978), while others have found mixed results (Berry 1976; Hellinger 1976b).

Several issues must be settled before one can say that rate review serves the public interest. First, what sorts of costs will be designated as being reimbursable and how will that reimbursability be determined? Will all costs be built into the rate base, so that rate review merely validates increases in cost-based reimbursement, or will some costs be excluded from the rate base? Will bad debts be charged to insurance carriers or to cash customers? Must those who receive care pay for the costs of medical education? Further, what will be the structure of the rates? Will some departments (those whose rates are not easily controlled) be allowed to subsidize others?

An issue related to the ability of the rate-setting authority to serve the public interest is the overall power of that authority. In the natural monopoly/public utility case, controls on entry and the establishment of rates are administered by the same agency. If hospital entry and hospital rate setting are not regulated by the same authority, then as more providers enter the market (under authorization from the CON-granting authority) rates must rise to cover the cost of maintaining increased capacity. Yet the issuance of CONs is, typically, in the hands of the health systems agencies established under federal law, while the establishment of rates is in the hands of state rate-setting authorities (Cohen 1976).

Although prospective rate review seeks to remedy the incentive to overcapitalize, such review has serious consequences for the labor costs of covered hospitals. Despite the recent growth in their capital stocks, hospitals remain very labor-intensive facilities. Thus, to hold the line on allowable hospital costs is to hold the line on labor costs, and rate-setting authorities must then become involved in the determination of wages and salaries.

It is in their wage-setting capacity that such regulatory authorities have encountered some of their greatest criticism. Weinstein (1979) argues that Maryland's Health Services Cost Review Commission has hampered the ability of hospitals to offer competitive wages and has prevented adjustments of the wages of women and minorities that are desirable on equity grounds. Schramm (1977) examined the rate-setting process as it affected collective bargaining. Such hospitals become involved in "multilateral" bargaining relationships (Kochan 1974) which include management, labor, and the regulatory authority. The presence of the regulatory authority in the bargaining relationship may constitute an interference in the process of determining wages and other rules of the workplace to the satisfaction of labor and management (an example of Wolf's (1979) unintended side-effects).

Regardless of the desirability or dangers of rate setting in the hospital industry, cost-based reimbursement makes it inevitable. Once consumer prices cease to be based on the market mechanism and become determined solely by costs incurred by the provider, incentives for provider cost-minimizing behavior vanish. At that point, whether controls on entry are instituted or not, demands will be generated for the review of reimbursement rates by some public authority. That is, once public utility-like reimbursement practices are initiated, it is inevitable that public utility-like reimbursement review will be demanded.

ALTERNATIVES TO REGULATION

Recent developments in the study of government regulation and recent experience with regulation itself indicate that, in many cases in which regulation has been introduced, its abolition might better serve consumer welfare. On the other hand, it has become commonplace to suggest that the market for health care cannot allocate resources efficiently. A number of scholars have proposed changing the structure of the medical marketplace to allocate resources efficiently without regulation.

Enthoven (1979a, 1979b) provides one comprehensive alternative to the current regulatory structure of the health care industry with his Consumer Choice Health Plan (CCHP).[7] Under the CCHP, each household would receive a tax credit (the amount to be determined by that household's actuarial cost of care) to be used to purchase health services. Each household would be free to use other funds for the purchase of additional health insurance, but would receive no special tax advantages for such purchases. Insurance would be offered in the form of "health care plans," consisting of groups of providers receiving prepayment from the individuals purchasing their packages. Every plan would be required to offer its services to all households (to prevent some plans from underpricing others due to refusal to accept high cost patients).

Under the CCHP, Enthoven argues, health care plans would have incentives to economize on the cost of services, thus removing the cost-increasing incentives now inherent in the health care industry. Further, consumers would have an incentive to search for lower cost plans, thus encouraging the formation of more efficient firms. Desire to obtain funds from the federal purse would encourage the entry of firms.

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[7] Havighurst (1979) has endorsed a variant of the CCHP.

McClure (1979) offers an alternative based, in part, on the CCHP model. Providers demonstrating that they operate in competitive environments would be freed from all government interference in their pricing decisions. Funding arrangements would be as suggested in the CCHP, encouraging the formation of efficient provider firms. Those providers who could not show that they were constrained by competitive forces would be subject to particularly strong "command and control" regulation. Under McClure's command and control regulation, total expenditure caps would be placed on health care expenditures for individual market areas. Fees would then be set for each regulated provider, based on historical market shares, to exhaust the total spending limit. Restriction of entry, which prevents additional firms' altering the market share arrangement in mid-period, are an integral part of such a plan. The logic of such a scheme is to make professional life under the discipline of competition preferable to life under command and control regulation.

CONCLUSION

This paper has outlined a basic argument on regulation of the health care marketplace. First, contemporary scholars suggest that regulation of markets is often enacted without regard to the interests of the consuming public. Second, there are significant costs that must be weighed against any benefits accruing from regulation. Third, some specific forms of health care regulation do not confer the benefits that their proponents claim. Finally, even though the current structure of the health care marketplace may require increased government intervention, that intervention may only exacerbate the costs of regulation borne by the public.

There are, however, alternative means of organizing and financing health care that might require less government intervention than current arrangements. These include plans developed by Enthoven and McClure. Such plans deserve hearing and experimentation before the nation embarks on further regulatory development.

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The Impact of Capital Expenditure Controls on Health Care Institutions *by Kenneth M. McCaffree and Thomas W. Bice**

INTRODUCTION

In attempting to curb rising expenditures for health care services, the federal government and individual states have turned increasingly to capital expenditures and services (CES) controls. These controls are intended to contain health care costs by limiting investments by health care institutions for expansion, modernization, the purchase of new equipment, and the provision of new services to those that are certified by regulatory agencies as needed in their communities. Although initially aimed primarily at hospital cost inflation (Curran 1974), state statutes, federal legislation, and regulations under the National Health Planning and Resources Development Act of 1974 provide for CES regulation of all designated "health care institutions."[1]

This paper reviews research on the impact of CES controls on both hospitals and nursing homes. The principal arguments for such regulation of hospitals, and the findings of recent studies on the impact of CES controls on hospital investment, utilization, and costs are first described and reviewed. Since no thorough discussion of the rationale for applying similar regulations to nursing homes or the results therefrom has been made, we examine the apparent bases for the application of CES controls to that industry. Only a few preliminary results of studies on regulating capital expenditure in nursing homes are available. We conclude by suggesting some policy implications that follow from the current state of knowledge on the effects of Certificate-of-Need legislation and other CES regulations on hospitals and nursing homes.

CES REGULATION OF HOSPITALS

Because hospitals have been the principal targets of CES controls, most of the debate concerning the desirability of this form of

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[1] Currently, one or both of the two principal types of program--Certificate-of-Need (CON) and Section 1122 of the 1972 amendment to the Social Security Act--are in effect in all but one of the states. Provisions of the National Health Planning and Resources Development Act of 1974 (P.L. 93-641) making various federal subsidies contingent upon states' having CON laws virtually assure their adoption by all states.

regulation and virtually all of the limited empirical assessment of its impact focus on the hospital industry. We examine first the arguments for and against CES regulation of hospitals and then present the data on their consequences.

Arguments For and Against CES

The principal rationales for CES controls attribute hospital cost inflation to basic features of the structure and financing of the hospital industry that lead to overinvestment and unnecessary utilization and costs.[2] These arguments typically point to four interacting causes of overinvestment:

1. considerations other than profit maximization that influence investment decisions;
2. the influence of physicians' preferences on these decisions;
3. Roemer's Law (here referred to as the "supply effect") that the supply of beds creates the demand for them; and
4. the presence of insurance.

The hospital industry is dominated by multiproduct, nonprofit firms whose investment and output decisions are amalgams of interests of their communities, lay boards of trustees, management, and medical staffs. Because hospitals must be responsive to the demands of various constituencies, their investment decisions reflect considerations other than profit maximization. To reflect these concerns, health economists have proposed a variety of goals for hospitals, including prestige and status (Lee 1971), the quality and quantity of services (Newhouse 1970), and social welfare (Feldstein 1961).[3] Although all specifications of hospitals' objectives are subject to the constraint that revenues must cover costs, their implications are similar: nonprofit hospitals' investment behavior does not conform to the model of pure profit-maximizing firms.[4]

Related to these observations is the argument that hospital investment decisions are strongly influenced by physicians' preferences. Because physicians select both the hospitals into which their patients are admitted and the mixes of services patients receive, they exert pressures on hospitals to provide the types and amounts of facilities and services they desire. These pressures combine with competition for prestige among hospitals to encourage investment in expansion and, more importantly, in upgrading styles of care (Feldstein 1971; Pauly and Redisch 1973).

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[2] Throughout this discussion we employ such terms as "over-investment," "unnecessary," and "need," recognizing that they are elusive terms. For a critique of the practice of basing health care planning on concepts of need, see Klarman (1977), and for a more general critique of these notions, see Posner (1974).

[3] For general discussions, see Davis (1971) and Berki (1972, pp. 19-29).

[4] Research has shown that proprietary hospitals are more likely than nonprofit hospitals to respond to demand shifts (Lave and Lave 1974), to adopt cost-saving technology (Pauly and Redisch 1973), and to limit their services to those that are most profitable (Ruchlin et al. 1973).

The supply effect observed in the hospital industry protects the hospital from losses due to investment in facilities and services for which demand is low (Berry 1974; Davis 1969; Feldstein 1971). In effect, this phenomenon implies that supply stimulates demand. Hence, within limits, hospitals can expand capacity and services with the assurance that additional beds will be filled and services will be used.

Finally, insurance for hospital care affects hospital investment in two ways. First, the greater coverage for inpatient services versus those services rendered in ambulatory care settings shifts patients into hospitals, where, due to low deductibles and coinsurance rates, patients pay out-of-pocket only a small portion of their total charges. Hence, patients are relatively indifferent to hospital costs incurred at the time of treatment. Second, cost-based reimbursement schemes protect hospitals from losses that might otherwise occur from poor investment decisions. Together, the guaranteed payment of costs (including debt service) and the assurances of high cash flows due to insurance and the supply effect place hospitals in favored positions in the capital market (Clapp and Spector 1978; Kelling and Williams 1978). This, in turn, facilitates more investment.

In combination, these structural and financial forces lead hospitals to overinvest in expanding and in improving of services, which in turn results in "unnecessary" expenditures for health care. Proponents of CES controls point to two indicators of unnecessary expenditures: excess capacity and inappropriate utilization. Excess capacity within a hospital, indicated by empty beds and idle equipment and services, is viewed as obvious evidence of overinvestment, implying that a portion of their fixed costs are unnecessary expenditures. Expenditures for inpatient services are deemed unnecessarily high in instances where patients' illnesses are amenable to treatment in less expensive settings and where, for patients who require hospitalization, less expensive combinations of diagnostic and therapeutic services could be employed.[5]

The argument for CES controls is thus straightforward. Unnecessary expenditures can be reduced by eliminating unnecessary facilities and equipment and preventing institutions from offering new services that are deemed unnecessary.

Although the rationales for CES regulation as a cost-control device are rather clear, critics of this approach note that CES regulation is based on several unwarranted assumptions.[6] First, they observe that regulatory agencies will be unwilling to enforce controls vigorously. Arguing from experience in other industries in which regulatory agencies have become "captives" of the regulated industry, critics predict that CES agencies will come to serve the interests of existing hospitals, primarily by blocking the entry of competitors. In turn, this will lead to monopolistic pricing practices, less innovation, and discrimination against unfavored institutions (e.g., proprietary hospitals).

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[5] Both notions of unnecessary expenditures are also related to quality-of-care arguments as well, leading some to favor CES controls even if they have no effects on costs. The frequency with which some services and facilities (e.g., open heart surgery) are used is positively associated with favorable outcomes. This argues for limiting the number of such facilities and concentrating them in regional centers. The psychic costs and other risks associated with hospitalization also argue for keeping people out of hospitals unless hospitalization is absolutely necessary (McClure 1976).

Second, critics note that agencies lack the knowledge and resources required to regulate effectively. Especially important in this regard is the elusiveness of the concept of need. As Klarman (1977) notes, need is a particularly difficult notion to measure in a setting where the supply effect occurs and where unknown varieties of input combinations are possible. With respect to resources, critics observe that CES statutes limit regulators' authority to only designated types of institutions and types of investments and services. Such exclusions, they argue, will encourage investment in the unregulated portion of the industry, thus thwarting regulation's cost-containment objectives. However, they note that, because the financial resources available to agencies are typically meager in comparison with those of the regulated industry, agencies will be inclined to employ them in a selective fashion. Arguing along these lines, Salkever and Bice (1976) conclude that such selectivity results in greater emphasis upon controlling growth of beds than on controlling investment in equipment and new services.

Finally, opponents of CES regulation assert that it will evoke perverse responses among the regulated that will counteract the intended effects of controls. Since no regulatory program can control all options, hospitals will be inclined to use other means to attain their objectives. The thresholds below which investment projects are not subject to review, for instance, invite hospitals to divide their plans into portions each costing less than the threshold limit. To avoid review, hospitals can enter into lease arrangements; this has occurred in several instances where hospitals' requests for certification of CT scanners have been denied. Also, one cannot know with certainty the effect CES controls will have on hospitals' investment plans. It is plausible to expect that since CES regulation in effect establishes a franchise for hospitals, these hospitals will enlarge their investment plans to avoid relinquishing to competitors the opportunity to grow or acquire new equipment. To the extent that this occurs, more investment may occur under regulation than in its absence.[7]

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[6] For an extensive and thorough critique, see Havighurst (1973).

[7] Proponents assert the opposite tendency, namely, that CES controls induce hospitals to plan more carefully and to abandon unworthy projects before they reach the formal review stage. Unfortunately, there are no convincing empirical data on this matter.

The Impact of CES

Two general approaches have been used to assess the effectiveness of CES regulation in controlling investment. The descriptive approach enumerates types and dollar amounts of proposed investments and counts as "savings" the projects and dollar amounts that are denied by regulatory agencies. The analytic approach attempts to estimate the types and volumes of investment that would have occurred in the absence of controls and measures the effects of regulation in terms of the difference between expected and observed patterns. Although each method has strengths and weaknesses,[8] the analytic approach is better (for reasons mentioned below) for assessing the overall effects of regulation on investment and on per capita expenditures for medical services.

Descriptive studies have generally shown that agencies are relatively strict in their reviews of applications for new hospital beds and are more lenient when considering proposals for modernization and the purchase of new equipment. Bicknell and Walsh (1975), for instance, found that during the first 19 months of CES regulation in Massachusetts, 20 percent of the 5,000 requested new short-term hospital beds were denied. Other applications not involving additional beds were denied less often. A study of 36 planning agencies in 20 states produced similar findings (Lewin and Associates, Inc. 1975). In these areas, more than 70 percent of the new beds requested by acute care hospitals were approved, and more than three-quarters of the agencies studied approved levels of hospital capacity in excess of those they themselves had set for their communities. In addition, nearly 95 percent of all applications for new equipment and services were approved.

A recent national study by the American Health Planning Association (1979) employed a broader definition of success and, accordingly, attributed greater success to health planning agencies' regulatory efforts. Instead of enumerating only those proposals that completed the formal review process, the Association gathered information on those that were withdrawn before definitive decisions were taken as well as others that were discouraged by "unofficial" agency actions and therefore were not formally submitted. Considering these along with the formally denied applications as evidence of CES control, the study concluded that, from 1976 to 1978, CES regulation averted more than 40 percent of the proposed expenditures for new beds and 20 percent of the proposed outlays for new equipment and services.

Although descriptive studies provide useful information about the preferences and behavior of regulatory agencies, their conclusions regarding the effectiveness of CES controls are necessarily ambiguous and are highly dependent upon how one defines success. Inevitably, such studies find that regulation deters investment, for agencies rarely approve all proposals submitted to them. Overlooked, however, are the various possible direct effects of regulation on health care institutions' investment plans. Some of these descriptive studies would underestimate regulation's effectiveness, for example, if the threat of denial caused institutions to suspend investment plans. Others would result in inflated estimates, for instance, when institutions accelerate their investment plans in order to preempt their competitors, or when they redirect their investments into projects that are not subject to CES regulation.

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[8] For a discussion of these, see Salkever and Bice (1979), pp. 27-29.

Analytic studies avoid this ambiguity by examining overall investment, not just that which comes to the attention of regulatory agencies. Hence, they take into account not only the consequences of agencies' formal decisions and "unofficial" actions, but also measure effects of the mere presence of controls on institutions' investment behavior.

Relatively few analytic studies of the impact of CES controls on hospitals have appeared in the literature. Two have shown that Certificate-of-Need (CON) programs in force in the early 1970s had no discernible effect on overall investment by hospitals (Hellinger 1976; Salkever and Bice 1976). However, Salkever and Bice (1976) found that CON regulation changed the composition of investment by reducing growth in beds and encouraging investment in equipment and other non-bed-related projects. In turn, these patterns resulted in lower utilization and higher per diem costs in the regulating states. These effects had competing influences on total hospital costs, the net result of which was to negate any overall effect of CON controls on per capita hospital costs (Salkever and Bice 1979).

Others have examined the impact of CON regulation on the stocks and diffusion of particular hospital services and facilities. Abt Associates, Inc. (1975) used cross-sectional state data for 1973 to estimate the effect of CON controls on ten services and facilities. In three services (X-ray therapy, cobalt therapy, and radium therapy) the coefficients for the CON variable were negatively signed, which the investigators interpreted as evidence of CON regulation's effectiveness. Since their analyses were cross-sectional, however, one cannot be certain that their CON variable was not confounded with pre-existing conditions. Russell's (1978) investigation of determinants of how rapidly hospitals adopted various innovations between 1965 and 1975 (and thus the level of their capital stock in 1975) showed no consistent effects for a CON variable. However, her study did not explicitly examine the possible impact of regulation on the relative increases in services and facilities in regulated states.

In sum, analytic studies of the impact of CES controls on hospital investment indicate that, as of the early 1970s, CON regulation 1) had no discernible effect on total hospital investment, 2) lowered the growth of beds, 3) increased investment in new equipment, modernization, and other "quality enhancing" projects, and 4) had no major impact on per capita expenditures for hospital services.[9]

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[9] All of the studies of CES controls' impact have focused on early experience under CON regulation (i.e., from 1968 to 1973) when about 20 states had such programs and have used dummy variables as measures of the programs. The choice of periods was

CES CONTROLS IN THE NURSING HOME INDUSTRY

We have found no thorough discussion of the rationale for applying CES controls to nursing homes, although some hints have been made by Havighurst (1973), Salkever (1976), Vladeck (1976), and Scanlon et al. (1979). The principal arguments for CES regulation have been applied only to hospitals. There are grounds, however, for questioning the applicability to nursing homes of the arguments used for and against CES controls of hospitals. We consider this issue first, given the characteristics of the nursing home industry, and then discuss the known and probable impacts of CES controls on nursing homes.

Industry Characteristics

Several characteristics of the nursing home industry would appear to justify a call for regulation. The industry is large and expanding, including more than 22,000 firms, or over one half of all inpatient facilities in the United States (National Center for Health Statistics 1978). Expenditures for nursing home services are also large and, following the introduction of Medicare and Medicaid, have increasingly involved public funds. In the periods from 1963 to 1969 and 1969 to 1974, nursing home growth exceeded that of the proportion of aged persons (i.e., 65 and over) in the population. In the earlier period nursing home beds were added at an average growth of 8.99 percent annually, while the aged population grew by 7.75 percent annually; in the latter period, the corresponding rates of growth were 8.70 and 7.18 percent (McCaffree et al. 1978, p. 19).

Expenditures for nursing home services exceeded $12.6 billion in 1977, a threefold increase since 1970 and almost a tenfold increase since the advent of Medicare and Medicaid in 1965 (National Center for Health Statistics 1978; Worthington 1975). The annual rates of growth in expenditures approximated 25 percent from 1965 to 1970 and fell below a 20 percent annual growth rate only recently.

The shift of expenditures from private to public sector sources has been even more dramatic than the increase in aggregate expenditures on nursing home care. Public expenditures have steadily increased from about 6 percent of the total in 1950 to about 57 percent in 1977 (National Center for Health Statistics 1978; Worthington 1975).

A major reason for these increases in expenditures has been the rise in demand for nursing home care brought on by rising proportions of aged persons in the population and the availability of public subsidies. However, they also reflect changes in the relative prices of nursing home and medical services and general inflation. The costs of

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dictated by the relative simplicity of the health services industry's regulatory environment before 1972, after which several types of controls were added in rapid succession (e.g., PSRO, Economic Stabilization Program, Section 1122, prospective rate settings). The use of dummy variables as indicators of CON programs was warranted because only a few states had such programs, and more finely characterized variables would have caused estimation problems.

providing a patient day of nursing home care rose by 140 percent from 1967 to 1973 (Worthington 1975) and by approximately 58 percent from 1973 to 1977 (National Center for Health Statistics 1978). Slightly less than half of the 1967-1973 increase can be explained by general inflation; the increase in expenditures in constant dollars was still 74 percent over these six years.

The expansion of the nursing home industry and its rising costs may have contributed to the decisions to include nursing homes among the facilities to be regulated by CES controls. However, an examination of the structure and dynamics of the industry reveals several characteristics that differ from those of hospitals for which most CES programs were designed. In this context it is worthwhile to recall the four factors that contribute to overinvestment in the hospital industry to guide our discussion of the nursing home industry: 1) institutional goals other than profit maximization, 2) influences of physicians' preferences on investment decisions, 3) the "supply effect," and 4) insurance.

Unlike the hospital industry, the nursing home industry is dominated by relatively small, proprietary units, with 75 percent of all nursing homes being operated for profit (National Center for Health Statistics 1977). Because of this, the industry is basically competitive. New firms are able to enter the market with relative ease, except as entry is limited by CES controls and licensing regulations. Furthermore, nursing homes are less likely than hospitals to compete for prestige or other objectives that might diminish profits.

Physicians' preferences for services and facilities are unlikely to strongly influence the types or amounts of investments made by nursing homes, as they do in hospitals.[10] By definition, nursing homes are not equipped to provide complex services, and when such services are required, patients are transferred to hospitals. Although the notion of "high quality care" in hospitals typically implies the availability of capital-intensive services provided by highly trained specialists, in nursing homes it more commonly refers to the ratio of personnel to residents, such intangible staff qualities as their caring and humaneness, and the comfort and pleasantness of surroundings.[11] Such matters are less likely to concern physicians, and they have little to do with criteria employed in CES regulation.

The supply effect, the strongest and most direct rationale for CES regulation of hospitals, has not been found in the nursing home industry. In part, this is because little work has been done on the question. However, findings from a study carried out in Massachusetts do not support the supply effect hypothesis. Reasoning that a supply effect would be evidenced by higher numbers of inappropriately placed residents in those regions with high ratios of nursing home beds to elderly population, Willemain and Farber (1976) found the opposite was true. This finding led Willemain to "warn against uncritical acceptance of the current theoretical justification for regulation of long-term care bed supply and to speculate on reasons for the positive rather than negative correlation between bed supply and (appropriateness of placement)" (Willemain 1977, pp. 402-403).

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[10] An exception would be when physicians are owners or part owners of nursing homes, in which cases their preferences probably coincide with profit-maximization.

[11] Differences in services are officially recognized in the current three-tiered classification of nursing homes into skilled nursing, intermediate, and personal care. Hence, an aspect of the notion of quality is whether residents are placed at the appropriate level.

Finally, the role of insurance in the nursing home industry has been less troublesome than in the hospital industry. Clearly, subsidies from Medicare and Medicaid stimulate demand for nursing home services and have accounted for shifts of elderly patients from hospitals to nursing homes (Russell 1973). However, there is less evidence of unnecessary use of nursing home services (or inappropriate placement) attributable to third party coverage analogous to shifts documented between ambulatory care and inpatient hospitals. Undoubtedly, many nursing home residents could be cared for in their homes were home care services widely and readily available and adequately subsidized by Medicare and Medicaid. However, this has not been the case until recently and at present it exists in relatively few places (Scanlon et al. 1979). Moreover, convincing evidence is lacking about the substitutability of home care services for nursing home care (Hellinger 1977) and about the potential cost savings that might accompany such alternatives (Weissert 1978; Weissert et al. 1979).

The matter of cost-based reimbursement in the nursing home industry is also not as directly associated with capital investment as in the hospital industry. One might argue that it is the combination of the relative lack of profit motives, the tendency to acquire sophisticated equipment, and the supply effect in hospitals that makes this mode of reimbursement undesirable. As we have noted, however, these forces are relatively less important in the nursing home industry. The problems associated with applying cost-based formulas to reimbursement of nursing homes center less on valuing capital inputs than on determining reasonable costs associated with adequate standards of care (Vladeck 1976).

Impact on Nursing Homes

In sum, CES controls have been extended to an industry where few of the arguments usually advanced for them seem to apply (Havighurst 1973, p. 1169). Because of this, one should not uncritically generalize the results of hospital studies to nursing homes. Furthermore, although no studies have been made that directly examine the impact of CES controls on nursing homes, a recent review of studies completed to date on determinants of growth found no significant role for CES controls (Scanlon et al. 1979). McCaffree et al. (1978), who examined the relationship between nursing home reimbursement policies and their elements and changes in the capacity of that industry, included a Certificate-of-Need variable in some of their analyses. The coefficient of CON was generally negative, indicating a slower growth in those states with that type of CES control. However, the coefficient was never statistically significant from zero.

It is reasonable to expect that CES regulation will primarily affect the growth of the industry as it has in the hospital industry. This is so, not because of the evidence of nursing home bed oversupply, but because nursing homes' capital investments are typically related to expansion.[12] Whether control over expansion of nursing homes will be as strict as that applied to hospitals is questionable, however. Some argue that, because state governments exercise near monopsonistic power over nursing homes, they should encourage expansion to promote price and quality competition (Vladeck 1976). Contrarily, Scanlon et al. (1979) suggest that, by maintaining strict control over nursing home growth, states are able to limit use of nursing home services by Medicaid enrollees.

Several considerations pertaining to the politics of CES regulation suggest that these controls, in combination with others, may affect not only the total growth of nursing home beds, but also the composition of the industry and the ways in which growth occurs. The capture theory of regulation and some descriptive evidence (Lewin and Associates, Inc. (1975)) suggest that entry of new competitors will be blocked. The simplest way to achieve this--one that would give the appearance of fairness--would be to deny all applications for construction of new nursing homes, while approving additions to existing ones. Even though such a strategy might result in overall growth, expansion would be confined to existing facilities. On this point, the political-economic theories of regulation (Noll 1975) would agree. Given the difficulty of determining need and the risk (when certifying new nursing homes) of errors that result in unused beds, a simple and safe approach would be to allow incremental additions to existing facilities. This approach would also allow closer screening of the unscrupulous or otherwise unfavored proprietors. Since agencies would have less personal experience with "outsiders" on which to base judgments on such factors within the CES guidelines as moral character, the strategy of keeping "outsiders" out altogether would be appealing. In turn, favors could be granted to existing operators with "good track records."

On the latter point, to the extent that some operators are virtually prevented from expanding or upgrading classifications, their businesses will become less profitable. When returns on investments dip to the point where prudence would dictate liquidating assets, existing proprietors would have the opportunity to expand through mergers or acquisitions. Alternatively, "outsiders" could be permitted to buy failing firms. If our previous reasoning holds, however, we would expect to see growth by mergers and acquisitions primarily among the existing operators, i.e., an increasing concentration of ownership and control in the industry.

Finally, our reasoning about "favored" proprietors may have implications for differential growth among proprietary and nonprofit firms. Lewin and Associates, Inc. (1975) found that many health planners freely expressed biases against proprietary health care institutions. To the extent that such views are translated into action, one would expect relatively less growth of all types among proprietary firms (i.e., through construction of new facilities, expansion of existing ones, mergers, or acquisitions) than would occur in the absence of CES control.

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[12] Data from a descriptive study of CES programs in 17 states showed that 74 percent of proposals submitted for review by nursing homes (as compared to 26 percent submitted by hospitals) were for new facilities and other expansion (Lewin and Associates, Inc. 1975, Table 4-1).

Since the pressures to upgrade styles of care through capital investment are less pervasive among nursing homes, we would not expect to observe the type of substitutions implied by Salkever and Bice's (1976) study of hospitals. Rather, one might predict that nursing homes under growth constraints would become less cost-conscious and would upgrade their personnel in order to qualify for higher reimbursement rates. Similar reasoning would lead one to expect personal-care and personal-care-with-nursing (intermediate care) facilities to shift to higher classifications,[13] wherever reimbursement differentials encourage such changes. Moreover, if Scanlon et al. (1979) are correct in their observation that growth constraints are employed by states to ration services, one might expect to see disproportionate growth among institutions providing higher levels of care. Such facilities are lower cost alternatives to hospitals for patients requiring medical supervision, and presumably states would attempt to reduce utilization of services primarily among the elderly who require only custodial care.

Hence, apparent growth in higher classifications might be due to classification changes rather than to the addition of new beds to existing stocks. An investigation of such shifts may reveal important insights into the dynamics of the nursing home industry that are overlooked by studies of net growth of skilled nursing and intermediate care facilities.

If tight control over the growth of hospital beds promotes growth of skilled nursing facilities through recruitment from below, the category of personal care beds would eventually be depleted unless new construction continually replaces the facilities lost through upgrading.[14] Since the stocks of personal care beds has diminished to the point of near disappearance, such replacement does not appear to be occurring. Hence, assuming continuation of tight control over hospital beds, the process we have been discussing would lead eventually to the point where strict CES regulation of skilled nursing facilities would give way to more permissive policies. The principal implication of this argument is that, because there are reasons to expect changes over time in the effects of CES controls on growth due to new construction, research on regulatory impacts should examine changes over relatively lengthy periods.

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[13] The names applied to various levels and/or types of facilities have changed over time. We use the nursing care and personal care with nursing classifications to approximate the current usage of skilled nursing facility and intermediate care facility, although we recognize some slight differences in the precise definitions. Nursing homes refer to facilities with nursing care, whether called nursing care, personal care with nursing, or skilled nursing facility and intermediate care facilities. Personal care facilities have not been generally included in the nursing home industry.

[14] The virtual disappearance of personal care beds raises questions as to where they went. In 1969, there were 3.3 personal care beds per 1,000 people over 65 years of age in the United States; by 1973, there were fewer than one per 2,000 (NCHS, annual). Part of this change is accounted for by growing numbers of persons over 65; the cause of the remaining difference is unknown.

In summary, differences between the hospital and nursing home industry require reappraisal of the traditional rationales for CES controls, insofar as such controls are applied to long-term care facilities. As in the hospital industry, however, theories of the behavior of regulatory agencies lead to the expectation that CES controls will deter growth within the nursing home industry and affect other industry characteristics. Growth in the industry is likely to occur primarily through the expansion of existing facilities rather than through new construction. Expansion of individual firms is likely to take place through mergers and acquisitions, and multifacility firms may come to predominate in the industry. Further, we would expect to observe more upgrading of existing facilities, as evidenced by reclassifications and higher levels and quality of noncapital inputs. Finally, where CES controls are effective in limiting the number of beds, a crowding effect in hospitals may result, which, in turn, will likely lead to more permissive policies under CES legislation.

CONCLUSIONS

CES regulation was originally fashioned to reduce rising health care costs by eliminating unnecessary expansion of hospital facilities and services. Several rationales suggested that such controls were needed to counteract market failures in the hospital industry: institution goals other than profit maximization, the influence of physicians' preferences on institutional investment decisions, the so-called "supply effect", and the presence of insurance. Some research has tended to confirm these arguments. Although similar rationales and research were lacking for the nursing home industry, it also was subjected to CES regulation; more recently, several state legislatures and the Congress have debated the desirability of extending these controls to physicians' offices. The limited and largely discouraging evidence pertaining to the effectiveness of CES suggests, however, that such extensions may be unwarranted.

The studies reviewed here indicate that CES controls have deterred the expansion of hospital beds while encouraging investment in modernization and the upgrading of styles of care. The net effect on hospital costs of these offsetting tendencies was negligible in the early 1970s, and virtually nothing is known about the potential side-effects of this regulatory approach. Although the quality of hospital services may have been improved, the real benefits of such changes have not been adequately documented in relation to the total costs of these regulatory programs.

Research on the impact of CES regulation on nursing homes is even more scarce than that dealing with hospitals, and studies reported to date have not found strong effects. Based on analyses of nursing home industry characteristics and fragmentary (and largely anecdotal) evidence about the regulatory process, we have speculated about potential problems associated with CES regulation in this industry. Our largely negative speculations need to be tested empirically.

It should be noted that nearly all of the research findings cited here are based on the early experience of CES regulation. As planning agencies mature, perhaps they will become more effective. Also, several states have placed hospital rate setting commissions alongside their planning structures, and cost-related reimbursement programs for nursing homes have been established universally. To the extent that health planning has improved and these newer forms of regulation deal with cost-containment issues beyond the reach of CES controls, earlier tendencies may be reversed. On the other hand, in the absence of more recent information than that cited here, we cannot necessarily assume that CES controls, either alone or in conjunction with other regulatory efforts, are curtailing unnecessary health care expenditures or contributing to other desirable ends.

The paucity of thorough information about the effects of CES controls accounts for the broad spectrum of policy recommendations espoused by proponents and opponents of this form of regulation. Unfortunately, available evidence can be cited to support almost any conceivable position. At one extreme, research showing that controls are ineffective due to loopholes and exclusions leads some to propose broadening the coverage of regulation. For example, the appearance of CT scanners in physicians' offices has signaled the movement to regulate physicians' purchases of that technology. At the other extreme, those who oppose CES regulation interpret the evidence as showing that these controls are inherently ineffective and recommend their abandonment.

Faced with this uncertainty, policymakers are steering a middle course. Recognizing the potential anticompetitive biases of planning agencies, Congress recently voted to reduce the coverage of CES laws, at least to the extent of exempting inpatient facilities operated by Health Maintenance Organizations from Certificate-of-Need review. At the same time, however, limited extensions of CES controls into physicians' offices were mandated to prevent circumvention of coverage of expensive technologies used for hospitalized patients. Perhaps this process of incremental reform will eventually produce a set of compromises that tolerably approximates what we as a society want from our health services industry and are willing to pay for.

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Health Care Regulation via PSRO: The Management Control System of Concurrent Stay Review *by David A. Dittman*[*]

INTRODUCTION

The utilization review technique of concurrent stay review (CSR), as currently implemented by Professional Standards Review Organizations (PSROs) under P.L. 92-603, is designed to monitor the appropriateness of an inpatient day of stay for federally insured beneficiaries in short-term acute care hospitals. This paper analyzes CSR as a feedback management control system. First, it briefly summarizes the component parts of PSRO, highlighting the factors that, in the opinion of the author, promoted the enactment of PSRO as a form of health care regulation. Second, it analyzes in detail the major management control system components of CSR. The effect of CSR in reducing utilization in short-term acute care institutions is investigated in terms of its effect on federal expenditures under retrospective cost reimbursement. Third, this paper reports both analytical and empirical studies of the benefits and costs of CSR that cast doubt on the effectiveness of this form of health care regulation. In conclusion, a rhetorical question is posed. If reduced utilization through audit anticipation can be obtained through a utilization review technique, e.g., retrospective review and claim denial, why do we use CSR as implemented under PSRO?

FACTORS INSTRUMENTAL IN PROMOTING PSRO

Briefly stated, PSRO legislation was enacted to correct an apparent failure of the competitive market mechanism to ration health resources efficiently. This failure occurred for several reasons. First, the dominant role of health insurance has insulated the consumer from direct financial responsibility for his own care, generally leading to excessive utilization. Second, the current system of retrospective cost reimbursement has not provided economic incentives for assuring appropriateness and intensity of care. Third, health care providers have been unable and/or unwilling to address the cost-quality trade-off that has resulted in a tendency to adopt technological innovations whose ultimate impact on the quality of care is evaluated in terms of a marginal benefit/marginal cost analysis.[1] Finally, a lack of expertise by the consumer (patient) often results in the de facto abdication of their choice concerning alternative treatment programs to the providers. It is interesting to note that these causes of market failure (that are the raisons d'etre for existing health care regulation) are also the institutional arrangements that are said to be the major contributors to health care cost inflation.

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[1] Hospital costs have been increasing 14 to 15 percent per year during the last several years, much faster than the remainder of the economy. A large part of this increase can be attributed to the increased intensity of services, i.e., advances in technology and changes in product. In other industries, increased investment in

PSRO has been mandated to address directly or indirectly these causes of market failure and hospital cost inflation. Specifically, P.L. 92-603 assesses for federal beneficiaries of Medicare, Medicaid, and Maternal and Child Health and Crippled Children's Services:

- the necessity of services rendered;
- the appropriateness of the facility used (i.e., the PSRO must assure that the care is provided in the most economical facility available, consistent with quality health care); and
- the quality of care (i.e., a PSRO must assure that the care delivered by an institution meets the acceptable "standards" that have been established by the PSRO).

The PSRO provision of P.L. 92-603 is designed to monitor the delivery of health care through three separate detailed review procedures: concurrent stay review (CSR); profile analysis (PA), and medical care evaluation studies (MCE).

Concurrent stay review is a form of utilization review implemented to provide a concurrent audit of federal beneficiary inpatient stays. Under this system, the law entitles a patient care coordinator to approve admissions, certify an appropriate length of stay (usually the 50th percentile of the average length of stay (ALOS) by diagnosis), and certify extensions for each federally insured patient's stay by applying professionally developed norms, criteria, and standards of care that have been developed by local physicians.

Profile analysis is a form of retrospective review in which a "profile" is defined as the presentation of aggregate data on the patterns of health care services over a defined period of time (Goran et al. 1975, p. 22). P.L. 92-603 requires profiles to be reviewed regularly for each health care practitioner and provider to determine whether the care and services ordered are consistent with the mandates of medical necessity, appropriateness of facility, and quality of care.[2] The profile reports provide aggregate data on surgical rates, lengths of stay, frequency of admission for a given diagnosis, frequency of medical procedures, frequency of complications, number

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technology usually results in labor and price savings; in the health industry the situation is often reversed. Increased investment in health technology often carries with it greater labor intensity and requirements for more highly skilled labor. Zubkoff et al. (1978) found that for each dollar invested in health care, operating costs increased an additional fifty cents per year.

[2] Goran et al. (1975) provide an excellent review of PSRO as implemented under current federal regulations, with emphasis on concurrent stay review. Goran (1979) provides an excellent update of PSRO with the emphasis on profile analysis as a means of determining which diagnosis, hospital, and physician should be the subject of concurrent stay review.

of days originally certified, number of days extended, and other pertinent data. PSRO review committees can then detect any physician or institution whose pattern of practice deviates from the norm, investigate the variance, and take any necessary corrective action.

Goran (1979, pp. 13,14) views profile analysis as a retrospective review system that can focus or direct concurrent stay review (i.e., admission certification and concurrent stay certification) to those institutions, diagnoses, or practitioners whose profiles deviate from designated standards. Concurrent stay review then can be used to investigate the underlying process that created the abnormal profile and either justify its existence or effect corrective action.

Medical care evaluation (MCE) studies, which generally qualify as patient care audits by the Joint Commission on Accreditation of Hospitals, are designed to encourage hospitals to examine the delivery process, as well as the results of patient care, on a regular basis, and identify deviations from pre-selected, explicitly stated norms, criteria, and standards of care. The MCE is intended to ensure that federal beneficiaries do not receive substandard quality health services due to pressure to decrease utilization through the application of concurrent stay certification and profile analysis. MCEs, however, may also be initiated as a result of any concurrent stay review or profile analysis that reveals abnormalities in the health care delivery process. Therefore, MCE can be used as another procedure to investigate and ultimately justify deviations from the norm or as an educational tool to change existing patterns of delivery.

UTILIZATION REVIEW AS A MANAGEMENT CONTROL SYSTEM

The major thrust to date in PSRO has been in the area of utilization review through the mechanism of concurrent stay review applied in short-term acute care hospitals (Goran 1979). It is on concurrent stay review (CSR) as a feedback mechanism of controlling hospital utilization that the remainder of this paper concentrates. A policy analysis is conducted by identifying and analyzing the various components of the control system.

A management control system with feedback contains five fundamental components (Cushing 1978). These components can be used to isolate the various parts of the concurrent stay utilization review. The basic elements of a feedback management control system, with their associated PSRO utilization review counterparts, are:

1. An operating process, which connects an input to an output. Under PSRO an inpatient stay for a particular diagnosis within a short-term general hospital can be viewed as a process of health care delivery that converts medical inputs (physician time, hospital resources, etc.) into medical outputs (diagnosis, treatment, and/or cure).

2. A characteristic of the process, which is the subject of control. The inpatient length of stay is the subject of control under the utilization review aspects of PSRO.

3. A measurement system, which assesses the state of the characteristic. Concurrent stay review is the measurement system by which an inpatient's day of stay is judged to be appropriate or inappropriate according to a particular set of standards.

4. A set of standards or criteria against which the measured state of the process is evaluated. The medical norms, criteria, and standards developed by the local PSRO physicians for each diagnosis present an objective predetermined comparison set for the observable states of a particular patient's day of stay.

5. A regulator or controller, whose functions are to compare measures of the process characteristic to the standard and to adjust the process if the comparison reveals that the process deviates from established standards. The PSRO patient care coordinator as an extension of the PSRO physician is the controller, and the denial of continued stay certification by the PSRO physician is the method for process adjustment.

Utilization review under PSRO is modeled as a feedback management control system in Figure 1. Local physicians develop or adopt preexisting standards, criteria, and norms by which a day of inpatient care for a given diagnosis can be judged. Through the process of concurrent stay review, a patient care coordinator assesses whether an admission or patient stay within an appropriate facility is medically necessary and meets minimum standards of quality. If there is a deviation from the standards, the PSRO physician (controller) informs the hospital, the patient, and the attending physician that continued certification is not justified. If no correction is made through an appeal and recertification or by discharge of the patient, the hospital is sanctioned by a discontinuation of federal insurance reimbursement for the days of care judged to be inappropriate.

Standard Setting

Within the framework of a management control model it is now possible to analyze systematically the process of utilization review under PSRO by analyzing its component parts. One of the most important components of CSR as a management control system, is determining norms, standards, and other criteria by which the patient care coordinator (controller) judges the appropriateness of an inpatient hospital day. If the standards are set too low or too high, then the control system will not be able to differentiate between an appropriate or inappropriate inpatient day of stay. When the standards are low, too many days of stay will be permitted that are medically unnecessary and/or are being rendered in an inappropriate facility. Standards that are too high might have just the opposite effect.

Therefore, the operational effectiveness of a management control system depends upon determining appropriate standards that enable the controller to classify a process correctly. For local PSROs this classification depends on norms, standards, and other criteria determined by the local PSRO physicians. As Blumstein (1978) has shown, locally established standards have not always been the rule. P.L. 92-603, in particular, expressed the clear intent that the National Professional Standards Review Council (NPSRC) exert national control over the standard setting process. The NPSRC was to approve regional norms and prepare and distribute to local PSROs appropriate materials indicating the norms to be utilized. However, the PSRO Manual has granted autonomy to each PSRO. The manual instructed each local PSRO "to review as early as 'feasible' the model set of norms 'in order to adopt or adapt them for their use.'" (Blumstein 1978, p. 470) Even then, the PSRO is free to develop its own standards without approval by the NPSRC.

The implication of local autonomy in the standard setting process certainly raises the question of regulatory capture by those whom the control system is to regulate. If the excessive utilization of inpatient facilities is prevalent in a local area, it is quite possible that the standards will incorporate these technological inefficiencies. In this case, the patient care coordinator will be unable to reduce excess utilization of short-term acute care institutions and, thus, fail to achieve the intent of the utilization review components of PSRO.

It is impossible, without conducting a controlled experiment, to determine whether regulatory capture of the standard setting process has taken place. However, it is possible to analyze existing evidence related to the impact utilization review has had on excessive utilization of short-term acute care facilities. If the standard setting process incorporates local technological inefficiencies, then utilization, as measured by the number of days of care by diagnosis, is not expected to decrease, given a PSRO has implemented CSR.

The limited evidence available tends to refute this hypothesis. For instance, Dobson et al. (1979) investigate the decrease in days of care (DOC) in short-term acute care hospitals for active and inactive PSROs. Using multiple regression analysis, they estimate a statistically significant reduction of 1.5 percent in DOC attributable to concurrent stay review for active PSROs relative to inactive PSROs. Introducing regional dummy variables into the regression equations also yields variations in DOC between active and inactive PSROs: Northeast, 4.0 percent reduction; North Central, 1.6 percent reduction; West, 2.0 percent reduction; and South, 1.3 percent increase. Although this study has been criticized on methodological grounds (Shapiro 1979), it represents the only empirical analysis of the effect on utilization due to concurrent stay review as implemented under PSRO. Further, it contains the only evidence available that technological inefficiencies may not have been incorporated into the PSRO standard setting process. Thus, although only secondary evidence, it does tend to refute the regulatory capture hypothesis in most regions of the U.S. However, the ambiguous nature of this evidence indicates that further investigation may be necessary.

In any case, it must be realized that participation by a local physician as the process manager does not require total control; consequently, requiring local PSRO standards, norms, and criteria to be rendered to and reasonably adjusted by the National Professional Standards Review Council reduces the possibility of local regulatory capture by the local physician. Notwithstanding Blumstein's (1978) observations of the law and the PSRO manual, the NPSRC is reviewing criteria to serve as a reference set and will also indicate where local guidelines deviate in an unacceptable manner from the reference set.

An additional problem with setting PSRO standards has been pointed out by Blumstein (1978). He argues that the "Waste Control" objectives of PSRO may not be enough to achieve its goal of cost containment, since implementing standards that reduce waste of medical resources by eliminating unproductive or counterproductive care is not an issue. However, cost problems may arise in those situations where "some care may be effective (that is, marginally improves the likelihood of cure or diagnosis) but uneconomic (that is, benefits do not outweigh cost)." (Blumstein 1978, p. 470) It is in these cases that the medical profession needs to address the cost/quality trade-off, and the place where it must be addressed is in the standard setting process. In particular, for an efficient allocation of health resources, the marginal (additional) benefits to be gained from the treatment cannot be less than the marginal (additional) cost of providing the treatment.[3]

Rosen (1978) argues that the explicit goals of cost containment and quality assurance in the PSRO legislation conflict in a way that dooms the cost-containment aspects of the law to failure. Higher standards of care usually result in greater utilization of inpatient hospital services and possibly a more conservative plan of treatment, thus lengthening the ALOS and thwarting cost-containment objectives. Physician control of standard setting has and can lead to increases in quality at the expense of cost containment due to the congruence between the physician's pecuniary interest (fee-for-service), the physician's desire to effect a cure or diagnosis, and the patient's desire for improved health. This is possible since even marginal, or potentially marginal, improvements can be pursued with little consideration of cost under our present form of health insurance.[4]

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[3] For a complete discussion of the use of benefit-cost analysis as applied in health planning, see Dittman and Smith (1979). Similarly, an excellent discussion of the quality/cost tradeoff applied to PSROs is found in Havighurst and Blumstein (1975). Total benefits being greater than total cost does not guarantee an efficient allocation of resources either for the health sector or the economy as a whole. Applying this criterion alone may lead to an expansion of technology causing hospital cost inflation. Efficiency is determined in the absence of a budget constraint where the marginal benefits and marginal costs are equal across all health projects. With a budget constraint efficiency is determined where $MB/MC = \lambda$, λ being the shadow price of a dollar increase in the available budget.

Finally, it is important to note that "as long as providers comply with PSRO norms and standards in effect in the region where care is rendered, and apply those norms and standards with due care, they cannot be held liable for malpractice under state law." (Blumstein 1978, p. 473) Since P.L. 92-603 immunizes providers who apply PSRO norms from any form of civil liability (par 1320c-16(c)), one might reason that there is significant economic pressure on local PSRO physicians to temper unwarranted increases in the standards and norms of care within a local area.[5] However, without empirical evidence on the PSRO standard setting process demonstrating that U.S. physicians increase standards at the expense of cost-control aspects of PSRO, firm conclusions that this will take place are unwarranted.

Concurrent Stay Review as a Measurement System

Another fundamental component of the utilization review under PSRO is the use of concurrent stay review as a system for measuring the appropriateness of a particular day of an inpatient's stay. Goran et al. (1975), in an excellent review of the PSRO Hospital Review System, describe concurrent stay certification as consisting of admission certification and concurrent stay review. Admission certification can occur either at preadmission (e.g., as in the case of second opinion surgery), or at time of admission (e.g., on the first day of stay). In the admission certification procedure the patient care coordinator applies either diagnosis-specific criteria or general hospital level-of-care criteria (when no diagnosis is known at admission) to judge appropriateness and assign a length of stay check point. Goran et al. argue that this initial length of stay check point should not exceed the 50th percentile of the length of stay derived from regionalized data such as that published by the Commission on Professional and Hospital Activities. At this check point the patient care coordinator performs a concurrent stay review of the patient. If the stay is determined to be appropriate, a new continued stay certification review date is established. If the patient care coordinator discovers a deviation from the standards, the case is referred to a physician advisor for final determination.

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[4] Pauly (1970) supports this argument for physicians who charge on a fee-for-service basis:

> The fact that patients will get marginally better care in the hospital (even if the benefits in some sense, fall short of the cost) and that the hospital may be a convenient, centralized location for the physician to see his patients (even though the cost of travel and disutility are less than the hospital cost) will induce the physician to put patients in the hospital even if the patients were indifferent on financial grounds. (p. 19)

[5] An investigation of Shephards Index of section 1320c-16(c) fails to uncover any cases to date of the use of PSRO standards or norms as evidence in malpractice litigation. However, an excellent paper by Abrams (1979) on PSRO standards under par 1320c-16(c) and its possible use as evidence in non-Medicare and non-medical malpractice cases tends to support the possibility of local physicians lowering the standards:

> One can easily envision a situation in which physicians establish PSRO guidelines as the sole measure of the duty of doctor to patient and then proceed to lower the standard so as to eliminate the possibility of malpractice liability. Even were the threat of manipulation eliminated, PSRO guidelines at the present time do not cover sufficient numbers of situations adequately enough to render their use as evidence extremely useful (p. 18).

The selection of the 50th percentile of the ALOS for a particular diagnosis indicates an investigation policy, i.e., when concurrent stay certification (CSC) will take place. There is no a priori reason to believe that performing CSC at the 50th percentile is an optimum policy. In fact, Riedel (1973) indicates that there is a possibility that the greatest amount of inappropriate utilization for a given diagnosis takes place at the beginning and end of the ALOS.

When a non-physician patient care coordinator performs the initial monitoring, a second screening is required by a PSRO physician in order to deny either admission or continued stay. However, certification of admission or continued stay needs only the certification of a non-physician patient care coordinator (Goran et al. 1975). Since a double screen is used for denials while a single screen is used for approval, it seems to be easier for an admission or continued stay to be certified appropriate than inappropriate. Thus, an inherent bias toward over-utilization may be built into the system as implemented. That is, the system is geared to "fail-safe" in favor of continued treatment of the patient.

Process Adjustment as a Mechanism to Reduce Federal Expenditures

CSR as a feedback management control system also provides a mechanism by which the regulator (PSRO Physician Advisor) can determine a deviation from standard and take action to adjust the process. This mechanism is the denial of Medicaid, Medicare, and/or Maternal and Child Health and Crippled Children's Services reimbursement for any continued inappropriate days of stay, rather than the termination the inpatient hospital stay. If the PSRO physician denies continued stay certification, the attending physician, the patient, and/or patient relatives must be notified and have the right to a detailed process of appeal. (See Blumstein 1978.) This utilization review system might be colloquially termed an "I gotch ya" control system. In order for the utilization review system to reduce inappropriate hospital utilization and its associated federal expenditures, an inappropriate day of stay must be detected through concurrent review, notification must be made, and the grace period must lapse before federal reimbursement is withheld on any added days of stay.

The current CSR system has no formal method to discover and deter inappropriate utilization that takes place before the scheduled CSC review date. This point is the main thrust of the analytical benefit-cost studies and will be discussed shortly. First, however, several observations need to be made concerning the ability of PSRO utilization review to adjust the process and effect the PSRO's cost containment objectives.

1. *Reduction in Federal Expenditures vs. Reduction in Inappropriate Utilization*

Because of the nature of the review process, inappropriate days of stay not detected or detected within two days of actual discharge are still reimbursed. Reduction in federal expenditures will only be achieved for those lengths of stay that are investigated at the concurrent review check point and found to be inappropriate. The savings accruing to the federal government are the expenditures that would have been incurred for a federal beneficiary had the inappropriate stay not been discovered through concurrent stay review. To justify such a control system, the expected reduction in federal expenditures must be greater than the cost (expenditures) for control. Although the above calculation may measure the reduction in federal expenditures of the control system, it does not measure benefits and costs to society as a whole. To the extent that medical resources are diverted from providing inappropriate care to providing appropriate care, society benefits by increases in the productivity of the health care industry. Further, to the extent that the marginal costs of resources consumed in the control process are less than the marginal benefits produced from control, control should be increased until equality between marginal costs and marginal benefits is obtained. (See footnote 3.) Since the control system allows patients whose stay has been deemed inappropriate to continue to utilize medical resources at their own expense after federal reimbursement has been terminated, it is possible to have benefits (cash savings) accruing to the federal government with zero or negative benefits accruing to society from the continued misallocation of medical resources to inappropriate inpatient stays.

In summary, the adjustment process works in two stages. First, federal reimbursement to the hospital is withheld for inappropriate inpatient days, and second, utilization is reduced to the extent that the length of the inpatient stay is sensitive to the reduction in federal insurance payments. If the hospital and/or the patient are (is) willing to bear the cost of inappropriate days of stay, utilization is not reduced and medical resources are consumed in activities that are considered to be inappropriate.

2. *Reduction in Federal Expenditures Related to Inpatient Hospital Stays*

The reduction in federal reimbursement for inappropriate utilization within a short-term acute care hospital through the process of PSRO utilization review depends upon both the total reduction in beneficiary days of stay and the significance of any shift in the relative utilization between federally covered beneficiary days and other inpatient days.

These effects on federal expenditures can be investigated analytically by representing the total expenditures of the users of a particular hospital as that hospital's net patient revenue function. For convenience all inpatient days can be divided into two groups:

federally insured hospital days, PD_c, for which the federal government pays average total cost, and other third-party insured and self-insured patient days, PD_{ch}, for which it is assumed that some percentage of full charge per diem, P, is paid.[6] The total expenditures, TE, by all users of the hospital is then

$$TE = PD_{ch} \cdot P + \frac{PD_c}{PD}(F + V(PD_c + PD_{ch})) \qquad (1)$$

$$= PD_{ch} \cdot P + \frac{PD_c}{PD} \cdot F + V \cdot PD_c$$

where $PD = PD_c + PD_{ch}$ = total patient days

F = the hospital's total fixed cost

V = the hospital's variable cost per patient day

P = some percent of P_f (the amount billed per patient day) representing the amount actually paid. $(P_f - P)$ is due to bad debts, courtesy discounts, charity write offs, and contractual adjustments to third party payers.

Equation (1) says the total expenditures made by all the patients at the typical short-term acute care hospital are equal to the number of charge patient days multiplied by the collectible charge per patient day, $PD_{ch} \cdot P$, plus the proportionate share PD_c/PD, of the fixed cost, F, attributable to federally reimbursed patients, $(PD_c/PD) \cdot F$, and the average variable cost, V, of treating these patients, $V \cdot PD_c$. This formulation is extremely close to the way medical reimbursement takes place.

The total expenditures paid by the users of a particular institution can be analyzed by taking the total differential of the total expenditure function (Equation 1):

$$dTE = \frac{\partial TE}{\partial PD_c} \cdot dPD_c + \frac{\partial TE}{\partial PD_{ch}} \cdot dPD_{ch}, \qquad (2)$$

where

$$\frac{\partial TE}{\partial PD_c} = \frac{PD_{ch}}{(PD_c + PD_{ch})} \cdot \frac{F}{(PD_c + PD_{ch})} + V \qquad (3)$$

and

$$\frac{\partial TE}{\partial PD_{ch}} = P - \frac{PD_c}{(PD_c + PD_{ch})} \cdot \frac{F}{(PD_c + PD_{ch})} \qquad (4)$$

are the partial derivatives of the total expenditure function with respect to federally insured hospital days (PD_c) and non-federally insured hospital days (PD_{ch}), respectively. Equation (2) represents the change in total expenditures due to a one day increase in utilization of federally reimbursed patient and non-federal charge patients.

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[6] The initial formulation of the net patient review function is borrowed from Cleverly (1978) who uses it to analyze a hospital's profitability. This analysis is easily generalizable to more than one class of cost payer. For convenience, however, all Title V, XVIII, and XIX patients are treated together as one group and all other patients are treated as paying charges. It is recognized that the reimbursement process modeled here is a gross approximation of the actual reimbursement process. However, the bases of cost reimbursement for federal beneficiaries is captured in this formation and thus insight is gained by the analysis provided in the text.

Three possible scenarios associated with effective utilization review are of interest here. First, PSRO utilization review may reduce federally insured patient days by amounts proportionally greater than non-federally insured charge patients; i.e., federal beneficiaries' utilization decreases relative to other patients' utilization.[7] An example of this situation is given by setting $dPD_{ch}=0$ and $dPD_c=-1$ in equation (2). In this case the change in total expenditures due to a decrease in appropriate federal beneficiaries' utilization by one day is:

$$dTE = -\frac{PD_{ch}}{(PD_c + PD_{ch})} \cdot \frac{F}{(PD_c + PD_{ch})} - V. \tag{5}$$

The federal savings are the variable cost per patient day, V, plus the percent of the average fixed cost $F/(PD_c + PD_{ch})$ that will be reallocated to non-federal patients based upon their share of the total fixed cost, $PD_{ch}/(PD_c + PD_{ch})$. It is important to note that this reduction in expenditures is less than the average daily cost savings, $F/(PD_c + PD_{ch})$, sometimes used to represent the savings from reduced utilization under PSRO (e.g. Rosen (1978)).

A second scenario is that non-federal utilization review can reduce non-federally insured patient days by amounts proportionally greater than federally insured patient days (i.e., non-federal utilization decreases relative to federal utilization). For example, if $dPD_{ch} = -1$ and $dPD_c = 0$, then the change in total expenditures due to a one day decrease in a non-federal charge patient's stay is:

$$dTE = -P + \frac{PD_c}{PD_c + PD_{ch}} \cdot \frac{F}{(PD_c + PD_{ch})} \tag{6}$$

The second term in equation (6) represents shifting the fixed cost back to the federally insured patient and thus is the added amount that the federal government would have to pay if other third parties had a more effective utilization review system. Since the total expenditures to all charge payers is $TE_{ch} = P \cdot PD_{ch}$, the marginal expenditures to the charge patients decrease by P for each decrease of one inpatient day. Therefore, since total expenditures only decrease by:

$$P - (PD_c \cdot F)/(PD_c + PD_{ch})^2$$

the difference must be borne by the federal government.

The third scenario assumes that federal and non-federal utilization review are equally effective. Here both utilization review procedures reduce each group's inappropriate utilization in a proportionate manner. It can be demonstrated that the resulting change in total expenditures for care in the hospital is:

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[7] Such a situation has occurred in at least one setting. Lave and Leinhardt (1976), in their study of utilization review of Medicaid beneficiary utilization in Allegheny County, Pennsylvania, found that the length of stay of Medicaid patients fell proportionately more than that of Blue Cross patients.

$$dTE = -P \cdot \frac{PD_{ch}}{PD_c} - V. \tag{7}$$

If both federal and non-federal utilization review systems are equally effective in deterring unnecessary patient days, then the savings for a one day decrease in federal cost reimbursement is, V, the variable cost per patient day. The overall savings to the charge paying parties for their proportional decrease is $P \cdot (PD_{ch}/PD_c)$, the cash paid per diem by charge patients multiplied by the ratio of charge patients to cost patients. Thus, in the short run there is no reduction in fixed cost, F; consequently, the same fixed cost is now allocated over a reduced number of patients. Therefore, if utilization review is applied across all inpatient days and has the same relative effectiveness for all inpatients, then the best savings that the federal government can obtain is the variable cost per patient day.

It should be obvious from the above scenarios that the greatest savings for the federal government occurs when it can reduce its patients' utilization of hospitals relative to other users. But as Dittman and Peters (1977, p. 37) point out

> With PSRO review being applied only to Federally insured patients, a reduction in their percentage utilization will shift a larger portion of an institution's fixed cost to private third parties and the self insured. The logical mechanism for third parties to use to reduce the average length of stay of their patient is an expansion of PSRO review to encompass their patients. Consequently, total utilization by all significant groups should be reduced as third parties try to reduce their proportional share of the institution's fixed cost. In fact there is some evidence that this adjustment may already be occurring. Twenty-four Blue Cross Plans (39 percent of all Blue Cross Plans) require utilization review as a contract requirement. And the Health Insurance Institute supports the concept of peer review inherent in the PSRO legislation and have urged its extension to the entire population.

3. *Shift of Federal Expenditures from Short-Term Acute Care to Substitute Health Services*

Federal expenditures change via one of the scenarios analyzed above when a federal beneficiary is determined through utilization review to be no longer appropriate as an inpatient at a short-term acute care hospital. The patient, however, may still be in need of covered services. For example, the patient may be shifted to a skilled nursing facility or require treatment via outpatient visits or home health services. From a federal expenditure point of view, savings that it obtains are the net savings in federal expenditures, that is, the decreased expenditures for short-term acute care less the alternate federal expenditures for substitute covered health services.

Further, from a federal expenditure point of view, it should be noted that reducing hospital utilization through PSRO utilization review increases the demand for skilled nursing facilities (SNF). If the increases in demand require the construction of additional beds, then, in the intermediate run, it may be more costly for the federal government to shift patients from short-term acute care institutions to skilled nursing facilities. This result is more likely if the shift in demand causes acute care hospitals to operate at idle capacity. By way of example, assume that both PSRO utilization review and other third-party review decreases their beneficiaries' utilization of acute care hospitals proportionately (Scenario 3). The increase in federal ex penditures for the new SNF beds then must be constructed as:

$$TE_{SNF} = \frac{PD_{c_{SNF}}}{PD_{SNF}} \cdot F_{SNF} + V_{SNF} \cdot PD_{c_{SNF}}$$

The cost of a day of stay in a newly constructed SNF will increase total federal expenditures, if the variable cost of short-term acute care is less than the average cost of SNF care. In addition, the fixed cost associated with the short-term acute care institution cannot be appropriately reduced as a result of the decreases in utilization of the acute care facility. Because federal expenditures may be increasing (or not decreasing) in the short run as a result of effective utilization review, it is important that shifts in utilization resulting from utilization review be accurately measured and properly associated with the cost of alternative forms of health delivery to evaluate properly the effects of PSRO utilization review on federal expenditures.

BENEFIT COST STUDIES OF UTILIZATION REVIEW UNDER PSRO

It is essential that a management control system designed to monitor hospital utilization review provide marginal benefits at least as great as the marginal costs of control. Several studies have been conducted that incorporate benefit-cost analysis in their evaluation of PSRO utilization review. They can be broadly classified as either analytical or empirical.

Analytical Studies

Averill and McMahon (1977) and Dittman and Magee (1980) are two analytical studies which are directly relevant. Averill and McMahon perform a stochastic analysis of concurrent stay review (CSR) at the 50th percentile of the patients' length of stay to compare the cost of CSR with the benefits of reducing inappropriate utilization. Specifically, they use a lognormal distribution to represent the length of stay of inpatients given a particular diagnosis and employ a variety of distributions to represent the inappropriate length of stay. From their analysis, Averill and McMahon conclude that the benefits do not exceed the costs of concurrent stay review.

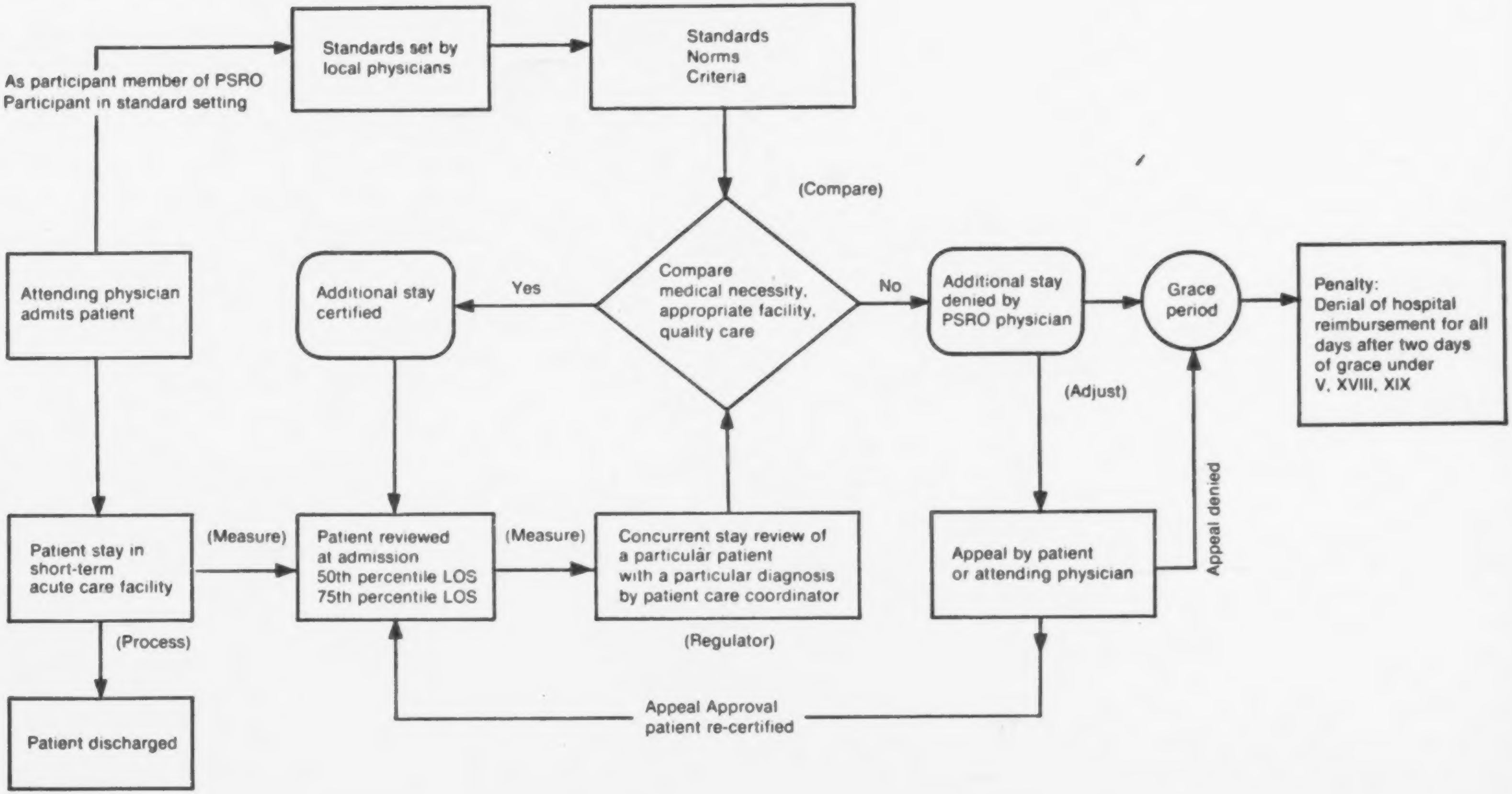
One interesting aspect of this study is that Averill and McMahon assume that a concurrent stay certification audit is performed for all patients who exceed the 50th percentile of the length of stay for a given diagnosis. The 50th percentile as a CSC review date was suggested by the Commission on Professional and Hospital Activities, and Averill and McMahon state "most hospitals are currently performing a CSC review for patients exceeding the 50th percentile of a length of stay distribution from the hospital's PSRO region." (p. 159)

In essence, the 50th percentile rule for CSC review is an investigative policy and has been set seemingly without regard to the cost-benefit trade-offs inherent to the investigation strategy. Consequently, even though the 50th percentile policy may be the one used most by hospitals and PSROs, it is not necessarily the optimal policy. Therefore, although Averill and McMahon conclude that concurrent review is not cost-effective under their assumptions, they effectively demonstrate only that a 50th percentile investigation policy is not cost-effective.

Dittman and Magee's (1980) model provides a unified utilization review model incorporating prospective, concurrent, and retrospective utilization review for a particular diagnosis. The main objective of their study is to select the concurrent stay review date and the number of days of stay for retrospective review that maximizes the net savings to the federal government. Although this model has not been utilized as yet to evaluate all possible profiles, the results to date are consistent with that of Averill and McMahon: continued stay review cannot be justified on a benefit-cost basis. However, retrospective review in the Dittman and Magee model does provide positive net benefits.

Although the models of both Averill and McMahon (1977) and Dittman and Magee (1980) indicate that concurrent stay certification does not produce current benefits to justify their current costs, neither study attempts to measure the decrease in utilization that may result from a deterrent effect of the CSR control system on the provider. That is, both studies measure benefits in terms of the number of inappropriate days detected by CSC review within a particular period of time and the eventual benefits of the reduction in federal expenditures from determining inappropriate utilization that would have continued if it had not been detected through CSC. However, if the PSRO utilization review is anticipated by providers who then decrease hospital utilization, such a deterrent to utilization can be maintained in a less costly fashion than CSR as now implemented under P.L. 92-603. Dittman and Magee tentatively indicate that focused retrospective review has current benefits greater than current costs and should provide at least as great a deterrent effect as CSC implemented under PSRO review. Goran (1979) indicates that focused CSR from profile analysis is the wave of the future. However, if this policy is implemented in a similar manner to CSR currently under PSRO, it is not probable that current benefits would outweigh the costs of review.

Figure 1: The Control System of Concurrent Stay Review Under PSRO


Standards set by local physicians
Standards
Norms
Criteria
As participant member of PSRO
Participant in standard setting
(Compare)
Attending physician admits patient
Additional stay certified
Yes
Compare medical necessity, appropriate facility, quality care
No
Additional stay denied by PSRO physician
Grace period
Penalty:
Denial of hospital reimbursement for all days after two days of grace under V, XVIII, XIX
(Adjust)
Appeal denied
(Measure)
(Measure)
Patient stay in short-term acute care facility
Patient reviewed at admission 50th percentile LOS 75th percentile LOS
Concurrent stay review of a particular patient with a particular diagnosis by patient care coordinator
Appeal by patient or attending physician
(Process)
(Regulator)
Patient discharged
Appeal Approval patient re-certified

Empirical Studies

Churchill et al. (1978) use a quasi-experimental time series design and exploratory data analysis over the time period 1968-1977 in their study of the behavioral effects of auditing the delivery of health care. They obtain statistically significant results that there is an audit anticipation effect as well as an effect from the actual audit of utilization, as measured by the length of stay on two primary diagnoses (acute appendicitis and primary cholecystectomy) in a Boston area hospital. Unfortunately, they had to eliminate all cases for patients over 65 years of age in order to obtain these results. Thus, the effects of PSRO utilization review on the Medicare population are removed from their analysis. They find, for example, through cross-tabulations of means for acute appendicitis that the population under 65 years of age or less had a 5.0 day median length of stay compared to a 12.0 day median length of stay for those over 65 years of age, with an average value of absolute deviation from the mean of 1.7 and 12.0 days, respectively.

These results are particularly interesting in the light of a study conducted by Dobson et al. (1978) who employ standard statistical-econometric analysis and find no significant effects of PSRO review: "Even though a few PSRO's have demonstrated cost-effectiveness, the PSRO program is not now cost-effective and thus is not yet serving as a cost containment mechanism" (Dobson et al. 1978, p. ii).

However, a more recent study by Dobson et al. (1979) reports that in a comparison of 96 active PSRO areas versus 93 areas without PSROs, 81 of those with PSROs show an average reduction of 1.5 percent fewer hospital days per 1,000 Medicare enrollees than those without PSROs. Through a detailed methodology employing multiple regression and a simulation of the benefits for individual PSRO areas, they estimate that PSRO has spent $45 million for concurrent review for Medicare patients while saving $50 million in federal expenditures. It is interesting to note that the ALOS in the PSRO and control group were the same, while the number of admissions in the PSRO areas decreased, thus decreasing hospital utilization. This result is a deterrent or anticipatory effect, but not a direct savings accruing from CSR under PSRO.

CONCLUSIONS

In the light of the reported analytical and empirical evidence, one question becomes apparent: Is concurrent stay review the most cost-effective form of hospital utilization review that can be performed? Although the amount of evidence is not overwhelming, it tends to point in the same direction. Concurrent stay review as a feedback management control system is a device that tends to decrease utilization. However, there may be a less costly way to regulate hospital utilization. Since concurrent stay review is very labor intensive and costly, a less expensive control mechanism may be indicated. If the decrease in utilization from utilization review under PSRO is due to a deterrent effect, then a retrospective utilization review system which maintains this deterrent to inappropriate utilization may produce the same results for a smaller federal expenditure. If the assumptions of Dittman and Magee (1980) are correct, then retrospective review may produce current benefits in excess of current costs while at the same time maintaining the deterrent or audit anticipation effort that was found by Churchill et al. (1978) and Dobson et al. (1979). Given the very low benefit-cost ratio reported by Dobson et al. (1979) of 1.11 resulting from $50 million in federal savings and $45 million in federal expenditures for CSR control, alternative forms of utilization review should be investigated. For, if benefits just equal costs, then we have control for control's sake, and we should look for more efficient ways to regulate or not regulate at all.

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Economic Incentives to Order Lab Tests: Theory and Evidence *by Patricia Munch**

INTRODUCTION

Expenditures on laboratory tests have grown rapidly in recent years. Comprehensive time-series data on the number and cost of these tests are not available. However, periodic surveys of hospital and independent clinical labs conducted by *Laboratory Management* since 1971 show an increase in the number of tests performed by independent labs from 812 million to 1970 to 1,694 million in 1978, a 109 percent increase. Over the same period, tests performed in hospital labs increased from 1,532 million to 4,038 million, an increase of 164 percent. These figures exclude an unknown number of tests performed in small physician office labs.[1]

There is concern that this growth in the use of tests is excessive. It is widely recognized that health insurance insulates consumers from the true costs of health care and makes them unresponsive to the price of care. This inelastic demand induces "excessive" utilization of all health care services.[2] Further, there is widespread belief that physicians are able to shift an already inelastic demand for their services. This charge of induced demand has been leveled in particular at laboratory services in at least three contexts: 1) the use of tests by physicians to circumvent attempts to control their income from other sources (Reinhardt 1978; Hadley *et al.* 1979);[3] 2) the use of tests as a form of defensive medicine, to reduce the threat of malpractice liability; and 3) the use of tests to increase income by physicians who perform tests in-house (Bailey 1968).

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[1] The distinction between independent and physician office labs is inevitably somewhat arbitrary. In these surveys, an independent lab is defined as any lab that employs at least one full-time technician. These figures, therefore, include the larger labs located in or close to physician offices, which may be under partial or total ownership of physicians, but exclude the smallest in-office testing facilities. In counting the volume of tests, each test in a panel is counted as a separate test. For example, an SMA 12 is counted as 12 tests.

[2] Because the insured patient does not pay the full price of health services at the point of purchase, insurance creates an incentive to demand services beyond the point where the marginal benefit is equal to the marginal social cost of production. This is the economic definition of inefficient or excessive utilization.

[3] "The individual physician's power to increase revenue through induced demand is apt to be a function of his/her ability to produce and prescribe ancillary services . . . often in the sincere belief that the . . . probability of a malpractice suit is thereby reduced." (Reinhardt 1978).

In addition to excessive utilization, there is concern that charges for tests by physicians may be excessive relative to their cost of production; that is, the cost savings brought about by automation of many routine tests may be captured by physicians rather than passed on to consumers.

Another area of concern is that physicians' choice of location of these tests may be inefficient. Efficiency requires utilizing those production techniques with lowest cost. The fact that one of the largest firms in the industry serves the entire country from a single facility in New Jersey suggests that there are potential economies in large scale production. Yet thousands of small labs survive. In 1975 labs performing over 500,000 tests per year accounted for only 6.6 percent of labs but nearly 60 percent of the total test volume of independent labs.[4] The coexistence of small and large firms in an industry is consistent with competition and efficient production only if there are not significant differences in cost, adjusted for quality, between the different firms.

Recent changes in Medicare reimbursement for tests are designed to create an incentive for physicians to utilize the cheapest source and pass on to consumers the potential cost savings of automation. In addition to the traditional, customary, and prevailing charge screens, maximum allowable charges for tests cannot exceed the 75th percentile of test prices charged by independent labs to physicians in a locality.[5] Further, reimbursement for the twelve most common tests is limited to the 25th percentile of the pooled distribution of charges by physicians and Medicare-approved independent labs (U.S. DHEW 1978). Prior to these changes, physicians' allowable charges for tests were not linked in any way to charges by independent labs.

This paper reports some results of a larger study (Munch 1980) of the effect of economic factors on the frequency of tests ordered by physicians, the prices they charge, and the location of tests (in-house or sent out). The analysis is confined to ambulatory care by office-based physicians. The focus on economic rather than clinical factors is dictated by the data available, not by the belief that clinical factors are less important. However, since reimbursement and regulatory policy influence economic incentives, it is useful to isolate the effect of those factors and determine to what extent they account for changes over time and differences at a point in time in physician behavior. The study also provides some evidence relevant to the debate on whether to place greater reliance on competition to regulate the medical market, or whether physician ability to induce demand makes further regulation for fees, utilization, and/or income the only viable means of controlling health care cost increases.

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[4] This understates the number of small scale facilities because of the exclusion of small physician office labs. The percent of physicians who report doing some tests in-house ranges from 1 percent for neurosurgeons to 90 percent for urologists. (See Table I.)

[5] Medicare Carrier's Manual part B, part 3 S 5114.2 Effective 12-31-78. Traditionally the maximum Medicare reimbursement for physician services and tests (maximum allowable charge) is the lesser of the actual charge, the customary charge (the median of the individual physician's charges for that service in the prior 18 month period), and the prevailing charge (the 75th percentile of customary charges in the locality).

MODEL OF PHYSICIAN BEHAVIOR

Previous analyses of physician behavior have not treated lab tests explicitly. For example, Reinhardt (1975) posits a demand for a one-dimensional physician output (visits), which is produced with three inputs: total physician hours, aides' hours, and capital. This type of formulation implies that output is increased by tests performed in-house but unaffected by tests purchased from outside labs; it implies that the price the patient is willing to pay for a visit is independent of the relative inputs of physician time, aide time, and tests per visit; it ignores the separate controls on reimbursement for time and for tests imposed by third-party payors. In fact, since tests are usually billed separately from the office visit and are subject to different controls by third-party payors, the physician's decision to order tests affects his revenue both directly (via the profit margin on tests) and indirectly (via the effect on demand for his services). Therefore, a model is developed here that specifies an explicit relation between the demand for a physician's services and his charges for tests and for his office visit, the number of tests, and the amount of physician time per visit.

Patients' basic demand is for health care, K, which is produced with inputs of physician time and tests. The total amount of care consumed by the ith patient is the product of the number of visits, n_i, and the average amount of care per visit, S, which is a positive function of hours per visit, H, and tests per visit, T:

$$K_i = n_i\, S(H,T)$$

$$S_h, S_t > 0;\; S_{hh}, S_{tt} < 0.$$

For convenience the average amount of care per visit, S, can be considered as the "quality" of a visit.[6]

The physician faces a demand for visits which is a function of the price and quality of the visit.[7] The composite price of a visit, P^n, has two components: the fee for physician time or office visit fee, P^v, and the fee for tests, P^tT. One purpose of this model is to determine the effects of a fee-for-service system in which reimbursement for physician time is not strictly proportional to the amount of time spent, whereas reimbursement for tests is strictly proportional to the number ordered.[8] To determine qualitative effects an extreme simplifying assumption is made that the charge and reimbursement for an office visit, P^v, is independent of the amount of time spent. Thus:

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[6] Strictly, S is the expected average quality of a visit as perceived by the patient, which may diverge from true quality due to imperfect information. The expected marginal product of a test, S, must be positive, although for some minority of tests the actual marginal product may be negative, due to false positive or false negative results.

[7] We abstract from patient time costs and health insurance. Thus, the charge billed by the physician is the full cost to the patient and is assumed to be paid in full.

$$P^n = P^v + P^tT \, .$$

Further, it is assumed that demand depends only on the composite price, P^n, and is insensitive to the division of the total price between the office visit and lab test components. Thus, the demand function for visits to the physician, N, may be written as:

$$N = N(S, P^v, P^tT) = N(H, T, P^v, P^t) \tag{1}$$

$$N_{P^v}, N_{P^t} < 0; \; N_S \gtrless 0$$

$$N_h = N_S S_h$$

$$N_t = N_S S_t + N_{P^n} P^t$$

Demand is negatively related to price. The derivative of quantity of visits demanded with respect to quality per visit, N_S, is uncertain a priori. An increase in quality, holding price per visit constant, is equivalent to a reduction in the price per unit of care. Total quantity of care, and, hence, number of visits demanded by existing patients will only increase if the demand for care is elastic. However, even if demand by existing patients is inelastic, the demand facing the physician may be elastic ($N_s > 0$) due to the attraction of new patients in the practice.

The physician produces visits with two inputs, physician time and tests, which are supplied at constant cost, w and c, respectively.[9] Thus, the composite cost of a visit, C^n, includes the physician time and test costs:

$$C^n = wH + cT.$$

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[8] There has been increasing flexibility in reimbursement for office visits, depending on the amount of time spent. The number of different categories of office visits recognized by the California Relative Value System increased from two in 1956 to 28 in 1974. By 1979, Medicare recognized ten different categories of office visits. To the extent that reimbursement for time is still less flexible than an hourly rate, the analysis applies.

[9] The constant cost assumption for physician time is appropriate if he can purchase time of other physicians or auxiliary personnel at the same cost in terms of efficiency units. The constant input cost assumptions simplify without qualitatively affecting the results of analysis.

Given these demand and input supply conditions, the physician is assumed to maximize profit with respect to hours per visit, tests per visit, price per visit, and price per test:

$$\max_{H,T,P^v,P^t} \Pi = NP^n - NC^n$$

$$= N(P^v + P^tT) - N(wH + cT). \tag{2}$$

Maximization of (2) subject to (1) yields the first-order conditions:

$$\frac{\partial \Pi}{\partial H} = (P^n - C^n)N_h - Nw = 0. \tag{3}$$

$$\frac{\partial \Pi}{\partial T} = (P^n - C^n)N_t + N(P^t - c) = 0. \tag{4}$$

$$\frac{\partial \Pi}{\partial P^v} = N + (P^n - C^n)N_{P^n} = 0. \tag{5}$$

$$\frac{\partial \Pi}{\partial P^t} = NT + (P^n - C^n)N_{P^n}T = 0. \tag{6}$$

Equation (3) implies that the marginal cost of increasing time per visit, Nw, is equated to the marginal revenue derived from an increase in quantity of visits demanded, due to the increase in quality. If $(P^n - C^n) > 0$, this implies that $N_h > 0$ and hence that $N_s > 0$. Equation (4), which is the analogous condition for tests, reveals two important differences between time and tests. First, in contrast to time, where an increase in time per visit does not directly increase revenue per visit, the direct net revenue effect in the case of tests is positive, as long as $(P^t - c) > 0$. Tests will therefore be increased until this direct positive effect on revenue is offset by a negative indirect effect, as the increase in tests per visit raises the price of a visit and hence reduces quantity of visits demanded. Rewriting equation (4):

$$(P^n - C^n)N_t = (P^n - C^n)(N_sS_t + N_{P^n}P^t) = N(c - P^t) \tag{4'}$$

Assuming $(P^n - C^n) > 0$ and $(P^t - c) > 0$, equilibrium requires $N_t < 0$. This requires that the positive demand shift effect, N_sS_t, be offset by the negative price effect,

$$N_{P^n}P_t.$$

Thus, if tests have positive diagnostic potential and, hence, stimulate the demand for visits, and if demand is inelastic with respect to price, the optimal frequency of tests (from the physicians' perspective) may be very high. This is obviously one reason why screening tests are not covered by many private insurance plans.

Rearranging equations (3) and (4) illustrates the distortion in input mix induced by the payment mechanism, which reimburses for tests in proportion to number of tests but reimburses for visits without regard to the amount of time per visit.

$$\frac{w}{c - P^t} = \frac{N_h}{N_t} = \frac{N_s S_h}{N_s S_t + N_{p^n} P^t} \tag{7}$$

The efficient first-order conditions would equate marginal input costs to marginal products in terms of quality of care:

$$\frac{w}{c} = \frac{S_h}{S_t}.$$

Relative to this efficient input mix, equation (7) implies an excessive substitution of tests for time.[10]

Equations (5) and (6) both reduce to the equality of marginal cost and marginal revenue:

$$C^n = P^n(1 + \varepsilon^{-1}_{NP^n}). \qquad (5)' = (6)'$$

Thus, if the patient is concerned only with the total price of the visit, there is a single decision as to the optimum composite price, P^n; maximization with respect to one component, say P^v, implies an optimum value of P^t, given T.

FACTORS AFFECTING FREQUENCY AND CHARGES FOR TESTS

This model indicates that the recent increase in frequency of tests may be attributable to changes in such factors as: the diagnostic potential of tests; the relative opportunity cost to the physician of time and tests; the growth in insurance coverage of tests; and constraints on reimbursement for office visits and tests. All of these have undergone changes in recent years.

Increased Diagnostic Potential

There has been an increase in the range and diagnostic potential of tests. To the extent that they increase the productivity of physician time and, hence, stimulate demand for physician services, the profit-maximizing frequency of tests is increased.

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[10] If physician time is reimbursed on an hourly rate, P^h, equation (7) becomes:

$$\frac{w - P^h}{c - P^t} = \frac{N_h}{N_t} \tag{7'}$$

The use of tests relative to time is excessive or suboptimal as:

$$(P^t - c) \lessgtr (P^h - w)$$

Relative Input Costs

The profit-maximizing ratio of tests relative to physician time is inversely related to the cost of tests relative to physician time (or other inputs). Although the cost of most health care inputs has risen over the last decade, the cost to the physician of tests has fallen in relative and, in some cases, even absolute terms, for two main reasons. First, automation has precipitated a dramatic decrease in the cost of performing many routine tests. For example, as a result of batching and automating blood chemistry analysis, multiple tests can now be performed for the cost of a single test performed manually.[11] Joint production of several tests in a panel tends to increase the profit-maximizing (and efficient) frequency of ordering the panel.

Second, the cost to the physician of tests ordered from independent labs has fallen due to increased competition in the clinical lab industry. This competition has lowered the price charged by the lab and effectively passed on to the prescribing physician the potential profit in tests. Bailey and Tierney (1975) argue that prior to 1969, the pathology profession allegedly enjoyed considerable monopoly power over both hospital labs and independent labs serving office-based physicians. In 1969, a consent decree entered between the Department of Justice and the College of American Pathologists barred pathologists from preventing independent pricing and from suggesting uniform fee schedules. Rulings at the state judicial level that laboratory fees are not considered the practice of medicine have permitted the growth of "commercial" labs not owned and operated by pathologists. This reduction in legal barriers to entry may have been offset somewhat by the growth in licensure requirements and quality control regulations at the state and federal level. However, in most states these do not appear to be sufficiently onerous to reverse the general conclusion that the trend has been towards removal of institutional obstacles to competition and, hence, lead to a reduction in the cost of tests to physicians.

Health Insurance

Patient demand for care is a function of out-of-pocket costs at the point of purchase. As out-of-pocket costs have decreased due to the extension of health insurance, patient demand for care has increased. In 1966, the Medicare and Medicaid programs introduced coverage of lab tests for the aged and indigent. The percent of the population with some private insurance for outpatient lab tests and X-rays increased from 41 percent in 1965 to 74 percent in 1975 (U.S. Bureau of the Census 1977). Insurance reduces the elasticity of demand for care, which tends to increase the profit-maximizing level of charges for tests and number of tests.

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[11] Statistics on test volume that count each test in a panel as a single test grossly overstate the growth in the frequency of the decision to order at least one test, which is the relevant economic decision. The efficient decision is to order the panel if the sum of the benefits of the individual tests exceeds the cost of the panel, even though the value of any individual test may be less than the cost of the panel.

Constraints on Reimbursement by Third-Party Payors

If reimbursement for tests is proportional to the number of tests but reimbursement for an office visit does not increase in proportion to the amount of time spent, an incentive is created for a profit-maximizing physician to substitute tests for his own time in excess of the efficient level indicated by a social cost-benefit calculus, as long as the profit per test is positive.

All insurance plans place some limit on the maximum amount they will pay for certain procedures (hereafter referred to as the physician's allowable charge). The model presented here indicates that a ceiling on reimbursement for office visits alone, with no constraints on charges for tests, leads to an offsetting increase in charges for tests. However, the ceiling has no effect on the frequency of tests or time per visit, provided patients are concerned only with the total composite charge for the visit and not its decomposition into charge for physician time and for tests.[12] Alternatively, if ceilings are imposed on reimbursement for both office visits and tests, then the profit-maximizing inputs of time and tests per visit would be affected. Precise conclusions depend on the specific assumptions of the model.[13] Under either assumption about the form of reimbursement for physician time, a ceiling on reimbursement for tests induces an increase in the frequency of tests (assuming no controls on utilization).[14]

It is important to understand the relationship between these results and the concept of induced demand. Ceilings on reimbursement for tests and probably for office visits will tend to increase the use of tests, even in the context of a model in which the physician faces an exogenously determined demand for care, i.e., where he has no power to shift or induce demand. A sufficient condition for this result is that demand for an individual physician's services is negatively related to his charges, or equivalently, each physician has some degree of market power. Characterizing the market for physicians' services as monopolistically competitive seems a plausible approximation to reality. Standard economic theory indicates that imposing price controls on a monopolist will result in an increase in his optimum level of output. In the case of medical services, binding constraints on reimbursement for physician time and tests are expected to induce output increases.

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[12] Formally, $dP^t = -dP^v/T$. Similarly, if a constraint is imposed only on reimbursement for tests, there will be an offsetting increase in the office visit fee but no change in input mix.

[13] If reimbursement for the office visit is strictly independent of time per visit, and tests and time are complementary in stimulating increased demand for visits, then a ceiling on office visit fees will increase the frequency of tests per visit. If the reimbursement for physician time is in proportion to time but the effective hourly rate is reduced, then the effect on tests is ambiguous. See Munch (1980).

[14] Obviously, if intended fee ceilings can be circumvented simply by reporting more complex or more numerous procedures than are actually performed, then the actual input of time and tests may not be affected.

In the absence of patient-time costs, the physician and his patients would be indifferent as to whether the increase in output takes the form of more frequent visits or more time and tests per visit. However, if each visit to a physician entails some fixed time cost for the patient, then patients would prefer more time and tests per visit, with little or no increase in the number of visits. This solution also maximizes physician revenue (since patient-time costs represent a loss of potential revenue to the physician) if the reimbursement system limits his hourly earnings, rather than his fee per visit. However, if the constraint is on fee per visit, regardless of time per visit, then there will be less increase in the time per visit and a greater increase in number of visits (and consequently in patient-time costs). Thus, some increase in tests in response to fee ceilings is expected as a result of a movement along a well-defined, exogenously determined demand curve, without any shifting of the demand curve by the physician to maintain some target income.[15]

Defensive Medicine

Finally, the physician may have an incentive to practice defensive medicine if he believes that he can reduce his expected cost of malpractice suits by performing additional tests. This expectation is equivalent to a reduction in his marginal cost of tests and will induce a higher test frequency. This effect requires either that the physician faces some uninsured costs of being sued, such as the physician's time and embarrassment, or that his malpractice insurance premium is related to his individual claim experience. To the extent that any increase in tests reduces the probability or severity of injuries, rather than just the probability of being sued or found guilty, defensive medicine has some positive social value, although the net social benefit may be negative.

EMPIRICAL EVIDENCE

In the absence of time-series data to test some of the model's predictions, cross-sectional data are used from the Survey of Physician Practice Cost and Income, conducted for HEW in 1975 and 1976. Both surveys are stratified random samples of office-based specialties (5 in 1975, 17 in 1976). The data are far from ideal for purposes of testing the theory. The 1976 survey contains information on the percentage of the physician's office visits for which a lab test or procedure was ordered in the week prior to the survey and whether simple blood tests, urinalysis, etc. are done in the physician's office. The physician's usual charges and usual reimbursement by Blue Shield, Medicare, and Medicaid for routine office visits is reported. However, corresponding charges for laboratory tests are not included. In the 1975 survey, respondents reported their usual charge and usual reimbursement for a complete blood count (CBC) in addition to a routine office visit. However, the frequency or location of tests is omitted. Samples are small, and missing or erroneous values are numerous. As a measure of controls on office visit fees the difference between the usual fee and the usual reimbursement by each third-party payor, weighted by the percentage of patients covered by that plan, is used.[16] Means, standard deviations, and definitions of all variables are given in Appendix Tables A-1 and A-2.

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[15] The model explicitly recognizes that, holding price constant, demand is a positive function of perceived "quality," i.e. an increase in tests or time per visit tends to increase the demand for visits. However, an increase in the number of tests per visit raises the total price of a visit. The profit-maximizing frequency of tests is such that the positive demand-increasing effect of an increase in tests is offset by the negative price effect. Of course, if the positive effect is large (as more tests reveal previously undetected ailments) and the negative effect is small (because the insured patients bears a very small fraction of the cost), then the profit-maximizing frequency of tests may be very large. However, as long as the patient bears some cost, frequency will not be pushed to the point where the expected benefit, as perceived by the patient, is zero or negative.

To test for the effects on physician behavior of the size and ownership structure of the independent lab industry, the following variables are included: the number of independent and hospital labs in the physician's zip code area; a measure of concentration of the labs in his three digit zip code area (the Hirfindahl index); and the percentage of labs in the three digit zip code area that are single or a member of a chain of six or more.[17] Effects of state regulation of independent labs are measured with dummy variables for specific licensure requirements and regulations of billing, such as truth-in-billing and anti-rebate laws.[18]

Table I reports means and standard deviations for each specialty of the frequency of tests, the proportion of physicians performing routine tests in-house, and the proportion who own or rent an

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[16] This is an imperfect measure because for unassigned claims the physician can bill the patient in excess of the insurer's allowable charge. However, since the patient's marginal co-insurance rate is 100 percent of any charge above the maximum allowed by the insurer, demand is expected to be highly elastic in this range, although not perfectly elastic (as implied by an absolute ceiling on payment from all sources).

[17] The omitted ownership category is member of a chain of 2-5 labs. The Hirfindahl index is a standard measure of industrial concentration computed as $\Sigma\, n_i\, (q_i/V)^2$,

where n_i = number of labs in the $i^{\underline{th}}$ size class (volume of tests per year);

q_i = midpoint of the $i^{\underline{th}}$ size class; and

$V = \Sigma n_i q_i$.

This index increases with the degree of concentration and is bounded by one where the market consists of a single firm. To distinguish between low concentration and zero labs, a dummy variable is included if there are zero labs in the area.

[18] In principle, frequency of tests per visit, time per visit, charges for tests and for visits, and the decision to perform tests in-house should be treated as joint endogenous variables in a simultaneous system of equations. Because the data available do not permit identification of such a system, only reduced-form equations are estimated for the frequency of tests, charge for a complete blood count, and decision to perform tests in-house.

Table I

Frequency of Testing and Performance In-House: Means by Specialty

Specialty	Frequency[a] Sample Size	Mean	Standard Deviation	In-House[b]
General Practice	289	.32	.24	.84
Internal Medicine	220	.45	.28	.80
General Surgery	201	.20	.21	.41
Obstetrics/Gynecology	257	.50	.34	.71
Neurosurgery	69	.17	.22	.01
Orthopedic Surgery	93	.08	.14	.03
Otolaryngology	91	.17	.18	.10
Urology	82	.69	.38	.90
Cardiology	58	.51	.31	.53
Gastroenterology	54	.46	.25	.55

Mean Number of Physicians, by Whether Tests Done In-House, and by Use of Autoanalyzer[c]

Specialty	Tests In-House	Tests Sent Out	With Auto-analyzer	Without Auto-analyzer
General Practice/ Internal Medicine	1.9	1.2	2.0	1.7
Pediatrics	2.3	1.6	3.1	2.1
Obstetrics/Gynecology	2.2	1.8	2.8	2.1
General Surgery	2.1	1.9	2.3	2.0

[a] % of office visits for which a lab test was ordered.

[b] % of physicians performing routine tests in-house.

[c] Full sample, including physicians sending tests out.

autoanalyser. Table II presents estimates of the effect of various economic factors on the frequency of tests.[19] There are significant differences among specialties. Relative to general practitioners and internists (the omitted category in the regression), obstetricians and gynecologists, urologists, and cardiologists order significantly more tests, whereas pediatricians and all surgical specialties order fewer tests.[20]

The effects of health insurance are partially consistent with theoretical predictions based solely on consideration of co-payment provisions. Blue Shield and commercial insurance plans typically require some patient co-payment; Medicare has a uniform 20 percent co-payment which may be covered by supplemental insurance; Medicaid typically has zero co-payment. The regressions indicate that, relative to Blue Shield (the omitted category), patients with commercial insurance or Medicare do not have a significantly different frequency of tests; patients with no health insurance have a lower frequency, as anticipated. However, contrary to predictions, Medicaid patients have the lowest frequency. It cannot be distinguished whether the significantly lower frequency for Medicaid patients is due to either the relatively large fraction of children and, hence, different case mix for this patient subgroup, or to higher billing costs and, hence, lower profit per test, or to some other factor.[21] Whatever the cause, this evidence does not support the popular notion of the "Medicaid mill," at least with respect to lab tests.

Table II shows that, at best, there is very limited support for the hypothesis that controls on reimbursement for office visits induce additional tests. As stated earlier, an increase in tests is expected only if there are also controls on reimbursement for tests and if an increase in tests tends to increase demand for visits.[22] However, the test of this hypothesis is weak because our measure of controls is theoretically imperfect and the data contain substantial measurement error. The coefficients of the fee control variables are positive for Medicaid and Medicare with supplemental insurance, as predicted, but significance levels are low.

There is evidence of a positive correlation between the frequency of tests and doing them in-house. Specialties with a relatively high frequency of tests also have a relatively high percentage of physicians performing tests in-house. (See Table I.) The number of physicians in the practice and a dummy variable for solo practitioners who do not share expenses are included in the regression (Table II) as

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[19] The dependent variable is the logit transformation of number of office visits in a week for which a lab test was ordered. The regressions are estimated using weighted least squares (Theil 1971).

[20] Note that these data exclude tests ordered in connection with hospital visits.

[21] See Sloan et al. (1977) for evidence on billing costs.

[22] The 1975 data on reimbursement for a complete blood count reported in Table III show that the ratio of usual reimbursement to usual charge is generally higher for tests than for office visits.

Table II
Frequency of Tests: All Specialties

Explanatory Variables	Dependent Variable: Logit of Frequency[a]	
	Coefficient	t Statistic
	Specialty[b]	
General Surgery	-.487	-4.16
Pediatrics	-.345	-3.55
Obstetrics/Gynecology	.237	2.39
Neurosurgery	-.546	-2.06
Orthopedic Surgery	-1.847	-8.83
Otolaryngology	-.721	-4.95
Urology	.421	1.89
Cardiology	.302	1.61
Gastroenterology	.201	1.09
	Patient Insurance[c]	
% No Insurance	-.371	-1.71
% Medicaid	-.589	-2.20
% Medicare Only	-.315	-.98
% Supplemented Medicare	-.405	-1.10
% Other Insurance	.034	.19
% Prepaid	-.237	-1.36
	Fee Controls[d]	
Medicaid Limit	.049	1.29
Medicare Only Limit	-.014	-.17
Supplemented Medicare Limit	.099	1.23
Medicaid Dummy	-.232	-1.73
Medicare Dummy	.262	1.87
	Physician and Practice	
Decade of Graduation	.001	.50
Foreign Graduate	-.208	-2.32
Male	-.101	-.67
Office/Hospital Visits	.005	1.90
Malpractice Insurance	.798	2.84

Table II: (continued)

Explanatory Variables	Dependent Variable: Logit of Frequency[a] Coefficient	t Statistic
	Physician and Practice (cont.)	
Full-Time Physicians	.039	1.66
Solo, Non-Sharer	-.232	-2.12
Physicians Per Capita	-11.44	-.47
	Laboratory Characteristics	
Independent Labs	.034	1.67
Hospital Labs	.028	.90
% Chain	.193	.62
% Single	.366	2.09
Hirfindahl	-.221	-1.80
Hirfindahl Dummy	-.196	-.91
Constant	-.532	-1.70

$R^2 = .1401$
$n = 1634$

[a] Logit of Frequency = $\text{LOG}\,\frac{f_i}{1-f_i}$

Weighted regressions: $W_i = n_i f_i\ (1-f_i)$,
where n_i = number of office visits last week

f_i = percent of visits for which a test was ordered.

[b] Omitted specialties are General Practice and Internal Medicine.

[c] Omitted patient insurance category is Blue Shield.

[d] (Usual Fee - Usual Reimbursement) x % Patients on Plan.

additional predictors of the probability of performing tests in-house. The number of full-time physicians has the expected positive sign and solo non-sharers the expected negative sign. However, because of simultaneous determination, this is not a measure of the net effect of testing in-house on test frequency. If there are economies of scale in producing tests in-house, physicians who expect to have a relatively high frequency of tests because of practice characteristics face lower unit costs and, hence, are more likely to perform tests in-house. Thus, the observed correlation does not support the inference drawn by Bailey (1968), that physicians in group practices perform more tests because tests are done in-house and in-house testing is more profitable. Aside from the inability to identify net effects due to simultaneous determination, this conclusion is logically flawed because the profit-maximizing physician will only perform tests in-house if it is cheaper than sending them out. If in-house tests can be produced at lower total costs than tests sent out (where total cost includes costs of transmitting the specimen from the patient to the lab and the results back to the physicians, cost of billing, and patient and physician time costs), then it is potentially efficient to utilize more in-house tests.

The evidence on the effects of the local lab industry are consistent with the general thesis that proximity of tests lowers the total cost and, hence, induces a (potentially efficient) increase in frequency. The frequency of tests is positively related to the number of labs in the physician's zip code area and to the percentage of labs in the three digit zip code area that are single labs. Frequency is negatively related to the Hirfindahl index of concentration. The category "single lab" includes small labs set up to meet the demand of small groups of physicians, perhaps with their part-ownership and perhaps even located in their practice. Thus, a relatively large proportion of single labs in an area is probably an indicator of low collection and time costs of tests. It is also indicative of reverse causation, i.e., such labs tend to locate where physicians generate a large volume of tests. Conversely, the index of concentration is significantly negatively related to the total volume of tests in the area. Low volume in an area tends to imply a relatively small scale of production, hence, relatively high production and collection costs.[23]

Finally, the regression equation in Table II shows evidence of defensive medicine. Physicians who pay a relatively high premium per dollar of malpractice coverage have a higher frequency of tests, after controlling for specialty, insurance, and patient characteristics. Interestingly, this variable, which correctly measures the price of insurance, has greater explanatory power than the total insurance premium, the upper limit of coverage, or the change in either the premium or the limit of coverage between 1975 and 1976.

Attempts to measure the effects of specific forms of state regulation of independent labs were unsuccessful. It is unclear whether this was because regulation, indeed, has no effect or because of the inadequacy of dummy variables in measuring the effect of laws that may have the same name in different states but vary in detail and in vigor of enforcement. Moreover, analysis of variance indicates that part of the effect of regulation is picked up by the variables measuring the characteristics of the independent lab industry. Without further research and better data, the forces underlying the observed correlation between regulation and industry structure cannot be distinguished. The relationship may be due to the effect of regulation on industry structure or to specific structural characteristics facilitating the passage of regulation.

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[23] Low concentration may also facilitate non-competitive pricing. However, in the absence of significant barriers to entry in this industry, monopoly power is unlikely.

Charges for Tests

The data on charges for tests are confined to the usual charge for a complete blood count (CBC) for a sample of 202 physicians in five office-based specialties in 1975. Means and standard deviations and the ratio of usual reimbursement to usual fee by Blue Shield, Medicare, and Medicaid are reported in Table III for a routine follow-up office visit and a CBC. These data are used to test several theoretical predictions. Specifically, considerations of demand elasticity suggest that the physician's optimum charge will be: higher in the absence of participation (Blue Shield) or assignment (Medicare) agreements;[24] higher for patients on plans where the plan's maximum reimbursement in one period is positively related to charges in some previous period (Medicare and Blue Shield and Commercial UCR plans); and unpredictable for Medicaid, to the extent that Medicaid fee schedules are determined independently of current charge levels.

A second prediction of the model is that the charge for tests will be positively related to the difference between the optimum and the maximum allowable charge for an office visit. A third prediction is that the charge for tests will be lower, the lower the cost of tests to the physician. As proxy variables for the cost of tests done in-house, a number of variables are included. The number of physicians in the practice measures economies of scale; the wage rate of industrial nurses in the country and a measure of urbanization control for input prices. As proxy variables for the cost of tests sent out, the Hirfindahl index of concentration and the percent of labs that are single or members of a chain of six or more are used.[25]

Table IV reports estimates of the effect of these variables on the usual charge for a CBC ($\log_e$). There are significant differences in charges by specialty. Obstetricians, gynecologists, and internists charge significantly less for a CBC than do general practitioners, general surgeons, and pediatricians, whereas the office visit fees of the former three specialties are higher. (See Table III.) The effect of health insurance is partially consistent with expectations. Relative to patients with Blue Shield and commercial coverage (the omitted category), the percent of patients on Medicaid and Medicare with assignment have no effect, but fees are significantly positively related to the percent of patients on Medicare without assignment. However, it would be erroneous to attribute the positive effect of non-assignment to the assignment process per se. A profit-maximizing physician will accept assignment only in those cases where it increases his expected net reimbursement. Thus, assignment will be accepted in precisely those cases where optimum charges would be low in any case.

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[24] Under participation or assignment agreements, the physician bills the insurer directly and agrees to accept the maximum allowable charge as payment in full, except for co-insurance.

[25] For 1975 the laboratory data are only available aggregated to the state level.

In the second equation in Table IV, the variables indicating controls by Medicare and Medicaid on reimbursement for an office visit are added. Although each alone is not statistically significant, their combined effect is significant at the 5 percent level. This result is consistent with the hypothesis that ceilings on reimbursement for office visits result in some offsetting increase in charges for tests.[26]

The pattern of coefficients for the laboratory variables is consistent with the pattern in the frequency equations. In particular, a relatively large proportion of single labs in an area is associated with both a higher frequency of tests and lower charges, whereas high concentration is associated with low frequency and high charges. This finding is consistent with the model, which predicts that physicians respond to the costs of tests and pass on to patients some of the differences in costs in order to induce the profit-maximizing changes in demand.

CONCLUSION

This paper has presented a theoretical and empirical analysis of the effect of economic factors on physician behavior with respect to number of tests ordered and prices charged. A theoretical model has been developed in which the physician is assumed to choose inputs of time and tests and to set charges for both with the objective of maximizing profit, subject to a well-defined demand for visits.

It has been argued that changes in recent years in the factors affecting demand and cost have combined to increase the (physician's) optimum frequency of tests, within the context of such a model. These factors include: increased diagnostic potential of tests; a reduction in the cost of tests to physicians, both absolutely and relative to other inputs, due to technological change and increased competition in the clinical lab industry; an increase in demand and decrease in elasticity of demand due to the extension of health insurance; a reimbursement system which tends to induce an excessive substitution of tests for physician time; attempts by third-party payors

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[26] However, an alternative explanation of this finding cannot be dismissed. If allowable charges are more uniform than actual charges, and physicians with relatively high charges for office visits also have relatively high charges for tests, then a spurious positive correlation would occur between the measure of controls on office visits and charges for tests.

Table IV
Regressions of the Usual Charge for a CBC (LOG_e)

Independent Variables	Regression 1		Regression 2	
	Coefficient	t Statistic	Coefficient	t Statistic
Obstetrics/ Gynecology	-.246	-2.44	-.298	-2.77
Internal Medicine	-.181	-2.62	-.212	-2.99
Pediatrics	.291	.73	.272	.67
Nurse Wage Rate	.175	.58	.029	.09
Full-time Physicians	.012	.94	.013	1.00
% Medicare Unassigned	.482	2.28	.354	1.41
% Medicare Assigned	-.024	-.08	-.127	-.42
% Medicaid	.182	.81	-.040	-.13
% Given Discount	-.316	-1.14	-.271	-.95
% Single Labs	-1.265	-2.36	-1.420	-2.62
% Chain Labs	3.108	2.44	3.042	2.34
Hirfindahl	.850	1.14	1.031	1.73
% Urban	.025	1.65	.026	1.64
Medicaid Limit	--	--	.049	.84
Medicare Limit	--	--	.035	.86
Constant	2.0850	3.42	2.444	3.87
R^2	.191		.207*	

*F significant at 5%.

to impose ceilings on reimbursement for office visits and tests; and the threat of malpractice liability. Thus, even during periods of particularly stringent controls on reimbursement, it is not necessary to resort to a hypothesis of induced demand in order to explain the rapid increase in test frequency.

Unfortunately, the empirical tests of the theory are hampered by imperfect data. Conclusions are therefore tentative. Nevertheless, there appears to be substantial evidence that physician decisions with respect to the frequency of tests, fees charged, and the decision to perform tests in-house are influenced and constrained by economic factors that affect demand for their services and input costs. Specifically, this study has shown that the frequency of tests varies significantly across specialties and is to some extent predictably related to indicators of demand elasticity. Frequency is positively correlated with characteristics of a local lab industry that would indicate low total cost (including collection and time costs). These characteristics associated with relatively high frequency of tests are also associated with relatively low charges. This is entirely consistent with movement along a well-defined demand curve. By contrast, if physicians were able to induce demand at will, frequency and charges would be unconstrained by, and hence unrelated to, medical and economic factors.

Consistent with other studies, this analysis finds a positive correlation between frequency of tests and whether tests are performed in-house. However, it is argued here that it is erroneous to conclude from this evidence that physicians are able to induce demand. Testing in-house may be the result rather than the cause of higher frequency. Moreover, if the full cost of tests done in-house is lower, higher frequency may be an efficient response. This remains an unanswered empirical question.

Assuming these conclusions are correct, the implications for reimbursement policy are twofold. First, further extension of insurance coverage for tests that enhance demand for physician services, such as screening tests, are likely to induce further increases in frequency and charges for tests, unless combined with substantial co-payment. Second, ceilings on reimbursement for office visits and tests are likely to increase the frequency of tests, since charges to patients will fall and demand responds positively to a decrease in price.[27] Because of the large range and volume of tests, direct control of utilization seems likely to be even less cost-effective for tests than for other health services. Thus, the case for market forces rather than government regulation is particularly strong in this area.

Policy conclusions with respect to regulation of the clinical lab industry must await further research. This paper has addressed only the issue of the effect of regulation on cost, not on quality. No evidence has been found that regulation at the state level affects either the frequency of tests or the physician's decision to perform tests in-house, contrary to theoretical predictions. However, measures of regulation used here are imprecise, and the estimation is hampered by correlation between variables measuring regulation and the structure of the lab industry. The directions of causation between structure of the lab industry, regulation of the lab industry, and prescribing practices of physicians are among the unresolved questions.

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[27] Our data are inadequate to measure the effect of fee controls. For evidence from other sources see Hadley et al. (1979).

Table III

Fees by Specialty, and Reimbursement Ratios by Insuror

	Routine Follow-up Office-Visit Fee			Complete Blood Count (CBC) Fee		
Specialty	Mean	Standard Deviation	Coefficient of Variation	Mean	Standard Deviation	Coefficient of Variation
GP (n=81)	10.24	2.27	.222	9.44	6.62	.701
GS (n=12)	10.66	4.03	.378	8.33	5.45	.654
PED (n=29)	10.45	3.22	.308	7.21	2.43	.337
OBG (n=22)	14.62	5.62	.384	7.09	3.46	.488
IM (n=91)	13.78	4.12	.299	7.57	2.65	.350
TOTAL	12.01	4.40	.366	8.03	4.75	.592
Insuror	Reimbursement Ratios					
BLUE SHIELD[a]	.722	.25		.900	.32	
MEDICARE	.744	.15		.772	.25	
MEDICAID	.685	.22		.798	.47	

[a] Blue Shield UCR or the best Blue Shield fee schedule.

Appendix

Table A-1: Definitions, Means, and Standard Deviations of Variables Used in Frequency, In-House, and Autoanalyzer Regressions

Variable	Definition	Mean	Standard Deviation
GP	General Practice	.174	
IM	Internal Medicine	.130	
GS	General Surgery	.118	
PED	Pediatrics	.155	
OBG	Obstetrics/Gynecology	.154	
CD	Cardiology	.035	
GASTRO	Gastroenterology	.034	
NEUROS	Neurosurgery	.040	
ENT	Otolaryngology	.056	
ORTHOS	Orthopedic Surgery	.055	
UROL	Urology	.049	
Office Visits	Office Visits per year ($\log_e$)	8.292	.70
Calls	House & Nursing home calls per year ($\log_e$)	4.326	.94
Male	Male	.958	
Full-Time Physicians	Number of physicians (> 20 hr. per week) in practice	2.000	1.54
Solo, Non-Sharer	Solo practitioner, not sharing expenses	.474	.50
Foreign Graduate	Foreign medical graduate	.153	
Hirfindahl	Hirfindahl index of labs in 3-digit zip	.302	.26
Hirfindahl Dummy	Dummy = 1 if zero labs in 3-digit zip		
Independent Labs	Number of independent labs in zip	1.377	1.89
% Single	Percent labs in 3-digit zip, single	.758	.25
% Chain	Percent labs in 3-digit zip, member of chain of ≥ 6	.065	.11
Hospital Labs	Number of hospitals with lab in zip	1.150	1.21
% Medicaid	Percent patients on Medicaid	.127	.15
% No Insurance	Percent patients with no health insurance	.106	.14

(continued)

Table A-1: (continued)

Variable	Definition	Mean	Standard Deviation
% Medicare Only	Percent patients with only Medicare	.099	.14
% Supplemented Medicare	Percent patients with Medicare plus supplemental insurance	.100	.13
% Other	Percent patients with other health insurance	.237	.19
% Prepaid	Percent patients prepaid	.026	.16
Decade of Graduation	Decade of graduation	48.200	11.10
Office/Hospital Visit	Office visits/hospital visits	5.270	10.50
Malpractice Insurance	Malpractice premium 1976/total limits of coverage	.010	.10
Physicians Per Capita	Physicians per capita in county	.002	.00
Medicaid Fee Control	(Office visit fee - Medicaid reimbursement) x % Medicaid	.587	1.07
Medicare Only Fee Control	(Office visit fee - Medicare reimbursement) x % Medicare	.276	.60
Supplemented Medicare Fee Control	(Office visit fee - Medicare reimbursement) x % Supplemented Medicare	.288	.63
Medicare Dummy	Dummy = 1 if Medicare reimbursement missing	.072	
Medicaid Dummy	Dummy = 1 if Medicaid reimbursement missing	.081	
Logit of Frequency	$\mathrm{Log}_e \frac{\mathrm{TESTS}}{1 - \mathrm{TESTS}}$	-.899	2.11
Autoanalyzer	Dummy = 1 if own or rent autoanalyzer	.082	
Office Lab Regulation	Dummy = 1 if regulation of physician office labs in groups	.240	
Tests	Percentage of office visits for which lab text or procedure ordered	.344	.30

Table A-2: Variables Used in Price of CBC Regressions

Variable	Definition	Mean	Standard Deviation
CBC Fee	Fee for a CBC ($\log_e$)	2.012	.430
OBG	Obstetrics/Gynecology	.107	
IM	Internal Medicine	.439	
PED	Pediatrics	.005	
Nurse Wage Rate	Wage rate of industrial nurses in county (BLS Metropolitan Area Wage Surveys, 1975)	1.705	.105
Full-time Physicians (MDS)	Physicians (> 20 hours per week) in practice	2.410	2.330
% Medicare Unassigned	% patients on Medicare without assignment	.195	.170
% Medicare Assigned	% patients on Medicare with assignment	.064	.120
% Medicaid	% patients on Medicaid	.104	.130
% Discount	% patients usually receiving discount	.057	.110
% Single Labs	% laboratories in state, single	.596	.080
% Chain $\geq$ 6	% laboratories in state, member of chain $\geq$ 6	.038	.030
Hirfindahl	Hirfindahl index of laboratories doing hematology in state	.042	.074
% Urban	% population in SMSA	.081	.023
Medicare Limit	(Office visit fee - Medicare reimbursement) x % Medicare	.410	.719
Medicaid Limit	(Office visit fee - Medicare reimbursement x % Medicaid	.844	.910

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HMOs and the Medical Care Market *by Harold S. Luft**

INTRODUCTION

The focus of national health care policy has recently turned from accessibility of health services to cost containment. While most observers agree that some means must be found to control rapidly increasing medical care expenditures, there is less agreement concerning the appropriate strategy. For the purposes of discussion, it is useful to identify two polar cost containment strategies, one relying on increased regulation and the other relying on increased competition. However, actual or proposed policies may represent combinations of the two approaches.

Among the pro-regulatory approaches are expenditure "caps" for hospitals, prospective reimbursement, Certificate-of-Need controls on capital investment, and public-utility style rate regulation. Among the pro-competitive approaches are policies to encourage Health Maintenance Organizations (HMOs); proposals by Senators Durenberger and Schweiker and Congressman Ullman to alter the tax laws to encourage competition among alternative health insurance plans; and Federal Trade Commission actions against the use of relative-value studies and physician domination of Blue Shield plans (Durenberger 1979; Schweiker 1979; Ullman 1979; Federal Trade Commission 1979).

There is a growing literature discussing the problems in implementing regulatory strategies (Enthoven and Noll 1979; Havighurst 1978; Noll 1975; Salkever and Bice 1976). In part, this may reflect the fact that in medical care the regulatory strategy was the first governmental approach, whereas the competitive strategies are either just being implemented or are still on the drawing boards. This paper will address one of the competitive strategies, HMOs, and present the available evidence concerning their potential for containing costs in the medical care system.

Until very recently, the focus of interest in HMOs has been on the cost and utilization experience of HMO enrollees. The available data support the claims that HMO enrollees enjoy 10 to 40 percent lower costs (premium plus out-of-pocket) than enrollees in conventional health insurance plans, with most of the cost differential attributable to lower rates of hospital use (Luft 1978). Although these differences may be large for the individual, they have little impact on total expenditures in the health care system because HMO enrollment accounts for less than four percent of the total population.

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In the last few years, analysts have developed a new perspective on the role of HMOs. This perspective looks beyond the impact of HMOs on their own enrollees, to the competitive impact that HMOs have on conventional insurers and providers. The notion is that as more HMOs compete with the conventional system through dual choice enrollment, the lower HMO costs may induce the conventional providers to develop means for containing their own costs. If it is true that a relatively small HMO market share, say 10 to 15 percent, could engender such a competitive response, then there could be an enormous potential role for HMOs in a market-oriented National Health Insurance strategy. Unfortunately, the research on the market effects of HMOs is so new and so rapidly expanding that any discussion of the state-of-the-art is analogous to using a Polaroid camera to photograph a soccer game. Whereas a given shot may capture the general direction of play, things may change substantially even by the time the prints from such a camera are developed. The following section of this paper will outline four models of the competitive influence of HMOs. Subsequent sections will review the evidence relating to each of these models. A final section addresses some of the policy implications.

MODELS OF THE COMPETITIVE INFLUENCE OF HMOs

Even though the medical care market lacks many aspects of competition, there are some clear instances in which competitive behavior occurs. Hospitals often compete for physicians to provide them with patients. This competition takes place by offering physicians new equipment, easier access to beds, and low-cost office space (Lee 1971, 1972). Insurance companies also compete with each other in the packages they offer to various employee groups. Such competition, which is usually based on experience rating, has all but eliminated the use of community rating by the Blue Cross-Blue Shield plans (Richardson 1977; Shain 1966). In fact, one may argue that some of the inefficiencies and inequities in medical care delivery stem from competition taking place in only a limited number of areas, such as those described. Either more or less competition might be better than that currently provided.

HMOs introduce a new competitive element. HMOs compete directly with conventional insurance plans and indirectly with local hospitals and physicians. The crucial question, of course, is the nature of this competition and its effect on the system.[1] Alain Enthoven (1978a) outlines three models of competitive responses by the conventional fee-for-service (FFS) sector. In Model I, Blue Cross and other third-party payors respond to HMOs and reduce per capita costs by constraining utilization by their members. Hospitals and physicians may also act to reduce costs by limiting patient utilization. In Model II the response by the FFS providers is perverse. As before, the FFS system faces excess beds and physician time because the HMOs have lowered resource use for part of the population. In this instance, however, the FFS system responds by raising fees and performing more and more discretionary procedures. Thus, under Model II, medical care costs per capita increase with the introduction of HMOs. Furthermore, Enthoven (1978a, p. 344) reasons that HMOs may have little incentive to exploit this response and may just let their costs float up along with those of the FFS providers. Enthoven's Model III breaks this comfortable relationship by introducing several competing HMOs within the same market. Because the HMOs compete by lowering premiums or increasing benefits, they have continued incentives for reducing cost and expanding their market share.

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[1] Other market-based external effects can occur inadvertently through the design of certain programs. The Federal Employees Health Benefits Program bases its employer contribution on the average of six large health plans, including the two California Kaiser plans. Thus, the Kaiser premiums have an impact on the government's cost for all enrollees. (U.S. General Accounting Office 1978)

Enthoven's Models I and III clearly are desirable from a public policy perspective. His Model II is relatively innocuous; it describes a situation in which HMOs accomplish little, but do no harm. Furthermore, Model II is unstable; the mere entry of another HMO can lead it towards the beneficial Model III. At least one more situation (Model IV) should be considered, one in which the benefits of competition are less clear. Within a dual or multiple choice environment, there is substantial potential for self-selection. It is possible that enrollees in HMOs, and particularly those in prepaid group practices (PGPs), have preferences for the lower HMO costs and may, in fact, be relatively low utilizers of medical care. For independent physician associations (IPAs) the situation may be reversed. Because an IPA enrollee can continue an existing relationship with his or her physician (and hopefully receive better coverage), the IPA may attract people who are somewhat higher utilizers. (See Luft 1980, Chapters 3 and 5 for evidence supporting this contention.) HMOs can also encourage low utilization through their marketing strategies, such as liberal maternity coverage to encourage the enrollment of young couples (Hudes et al. 1979). Even mandatory open enrollment can be overcome through subtle changes in the benefit package and, for PGPs, location of clinics in desirable neighborhoods. Thus, in Model IV, HMO enrollment grows and utilization and cost differences widen, but at least part of these differences are attributable to selection effects.

In this hypothetical Model IV, the enrollment in HMOs of a relatively low-cost population leaves the conventional carriers with an increasingly more expensive population pool and makes it more difficult for them to compete with HMOs. The fee-for-service sector may also become fragmented as certain carriers establish IPAs on the SAFECO model or Paul Ellwood's Health Care Alliance model (Gregory 1978; Moore 1979; Reynolds 1977; Ellwood 1976). Such organizations are designed to exclude FFS providers who are "costly," but they may also exclude providers with relatively less healthy patient populations (Jones 1978). Equilibrium in Model IV occurs with large PGPs composed of people who desire relatively little medical care and a series of IPAs or similar organizations providing more and more services at increasing premiums. In essence, Model IV describes a relatively extreme form of experience rating in which the healthy pay less and the sick pay more, a rather undesirable outcome of HMO competition from a social standpoint.

In contrast to the potential importance of the competition issues, there has been relatively little research on the subject. (Ramsay and Wright (1978) present a simulation model of market responses to HMO growth, but there is no empirical base for their results.) Furthermore, the available evidence is consistent with a wide range of interpretation. The next four sections will briefly review the evidence bearing on each of the four models of competitive impact.

Model I -- Cost Containing Response by Conventional Providers

A Federal Trade Commission study by Goldberg and Greenberg (1977) represents the seminal research in analyzing the market effects of HMOs. They support Model I by arguing that the entry of HMOs is responsible for lowering the utilization of enrollees in conventional health insurance plans. They rest their case on two types of analysis: regressions of hospital utilization by Blue Cross members as a function of HMO market share and other variables, and interviews in various HMO market areas. The regressions, using cross-sectional state data, show that (a) nonmaternity hospital days per 1000 federal employees and their families in Blue Cross, (b) maternity length of stay for those enrollees, and (c) total hospital days per 1000 non-federal Blue Cross enrollees all have statistically significant negative relationships with respect to HMO market share. However, the regressions are dominated by four West Coast states: California, Washington, Oregon, and Hawaii, all of which have both high HMO market shares and low utilization rates. When these four states are omitted, the negative relationship is no longer significant (Enthoven 1978a, p. 336). The interviews indicate clear competitive reactions by Blue Cross of Northern California to the growth of the Kaiser Permanente plan. Blue Cross substantially increased its coverage of ambulatory services and encouraged direct comparisons with Kaiser. Unfortunately, there is little supporting evidence in other geographic areas.

A historical perspective supports the notion of a competitive response in Northern California. The San Joaquin Foundation for Medical Care was founded to prevent Kaiser from expanding into the Stockton area (Sasuly and Hopkins 1967). Reactions by FFS physicians to Kaiser in the early 1950s included picketing and leafleting (Garbarino 1960). Numerous articles appeared in local medical society journals decrying rising hospital utilization and predicting the demise of voluntary Blue Cross and Blue Shield plans. Calls for shorter stays, more outpatient care, and the like appeared with clear references to the dangers that increasing premiums posed to the continued existence of such health insurance programs (Sherrick 1951, 1952; Thomas 1951; Moffitt 1951; Cheney 1951). Thus, this historical situation also is consistent with the hypothesis that conventional providers, when threatened by new HMOs, alter their practice patterns to prevent further competitive losses.

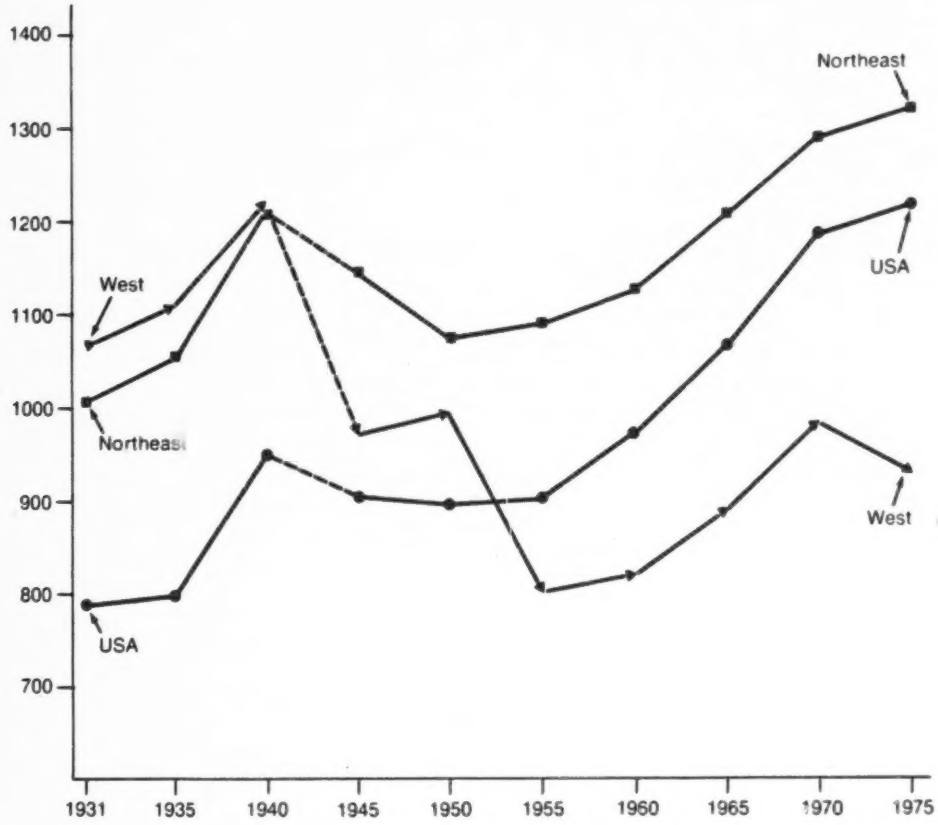
Long-term trends in hospital utilization also lend support to Model I. One of the major weaknesses in the Goldberg-Greenberg study is that the regressions primarily reflect the lower utilization rates on the West Coast, and that these lower rates may have nothing to do with HMOs per se. However, these geographic utilization patterns appear in all population groups--Medicare beneficiaries, Blue Cross members, federal employees, people in the National Health Survey, and total hospitalization statistics (Gornick 1977; Blue Cross Association 1974; U.S. Civil Service Commission 1961-75; U.S. National Center for Health Statistics 1977; American Hospital Association 1975). As Figure 1 indicates, this well-known pattern first appears between 1950 and 1955, precisely the period of substantial HMO growth on the West Coast. Although this evidence supports Model I, it could also be attributable to a wide variety of other factors, such as a rapidly growing and youthful population, pressure on medical resources, or higher levels of employment. (Research is currently underway to investigate the relative importance of these factors on this changing pattern of utilization (Luft 1979).)

An alternative approach, avoiding the problem of the "West Coast effect," examines hospitalization rates by metropolitan area. A study by Chiswick (1976) shows significantly lower admission rates in standard metropolitan statistical areas (SMSAs) located in states with HMOs. Unfortunately, Chiswick merely uses a dummy variable for HMO presence and thus cannot discriminate among SMSAs in the same state with and without HMOs. Researchers in the Health Policy Program at the University of California are currently undertaking a similar cross-sectional analysis but are focusing on the HMO market share in the SMSA. Two equations are specified in a simultaneous model. The first explains non-federal short-term hospital beds per capita as a function of socioeconomic variables and HMO market share. The second examines patient days per capita as a function of sociodemographic factors, health insurance coverage, physician supply, predicted bed supply, and HMO market share. Preliminary results indicate that HMO market share has no significant impact (t-ratio is about - .6) on the bed supply, a measure of the long-term competitive effect. HMO market share does have a significant negative effect on total patient days per capita. However, when hospital use by HMO members is removed from the numerator and the number of HMO enrollees is removed from the denominator, HMO market share has no impact on the utilization of non-HMO members. Thus, these preliminary findings do not support Model I's notion of a competitive effect.

Model II — Cost Increasing Response by the Conventional Sector

Enthoven provides two sets of empirical support for the cost increasing response described by Model II. One relates to a number of

Figure 1: Hospital Days per 1,000 Population



Dotted line indicates change in the definition of hospital days. Northeast region is composed of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania. West region is composed of California, Oregon, Washington, Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, and, from 1960 on, Alaska and Hawaii.

Sources: 1931-40. Annual Presentation of Hospital Data by the Council on Medical Education and Hospitals of the American Medical Association in the *Journal of the American Medical Association*. These data refer to the utilization of general, maternity, eye, ear, nose and throat, children's, orthopedic, and isolation hospitals.

1945-75. *American Hospital Directory*, 1946, and annual guide issues of *Hospitals*, Journal of the American Hospital Association. These data refer to non-federal short-term general and other special hospitals.

Civilian resident population of each state is presented in U.S. Bureau of the Census, *Current Population Reports*, Series P-25. The civilian population figures are used instead of the more common total resident figures because the hospital statistics exclude military hospitals.

studies of fee-for-service physicians showing that where demand is lower, fees are higher and physicians work less. There is also some evidence that physicians can directly influence demand, perhaps by treating problems of lesser importance when there is a higher ratio of physicians per capita (Fuchs 1978; Evans 1974). Thus, FFS physicians might react in the way that Model II predicts. The second set of evidence concerns HMO premiums relative to those of Blue Cross-Blue Shield for federal employees. Over a ten-year period, HMO premiums have stayed within a range of $10 above to $5 below the Blue Cross-Blue Shield rates. This supports the concept that the HMOs did not aggressively constrain the growth in costs over time.

If competition between HMOs and conventional providers affects overall costs, one might expect it to appear in California, with its massive Kaiser plans, competing HMOs in Southern California, and a documented history of Blue Cross concern. An examination of per capita health expenditures by state provides little support for the competitive model (Cooper et al. 1975).[2] California ranks third among the 50 states in per capita expenditures on health, even though its cost of living is lower than for the top-ranked states, Massachusetts and New York. But how could this happen when hospitalization in California is so low? The answer is that while hospitalization is the largest single type of expenditure and is easily measured, there are other important elements of health care costs. Perhaps as a result of the improved ambulatory care coverage by conventional insurers, California ranks second in the share of per capita expenditures going for physicians' services. (Washington State, also with high HMO penetration, is first.) Consequently, California ranks 46th in the share of expenditures going for hospital care. Thus, although by some standards the mix of medical services bought by Californians may be more efficient because of the small share for hospital services, there is no evidence that massive HMO enrollment has resulted in overall cost containment.

These findings on total medical care expenditures, which support Model II, also are consistent with reduced hospitalization (Model I). Even if conventional providers constrain hospitalization in the face of HMO competition, they might maintain their incomes by increasing charges and by providing more physician services (Models II or IV). Dyckman (1978) finds that after adjusting for the cost of living, surgical fees are highest in Los Angeles and are also high in New York, San Francisco, and Sacramento--all areas with high HMO market penetration. In fact, one of the responses by Blue Cross of Northern California to Kaiser competition has been to increase its coverage of ambulatory sevices and encourage efforts to reduce hospitalization. The strategy may have succeeded all too well, resulting in high rates of unmonitored ambulatory procedures.

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[2] Unfortunately, these data refer to 1969; however, more recent data for the Medicare population yield similar results.

Model III -- Cost Containment Resulting From Vigorous Competition Among Several HMOs

As indicated above, there is little evidence of successful cost containment in California. One could argue, however, that the California HMO market is non-competitive, being dominated by Kaiser, with only token penetration by the rather staid Ross-Loos plan and several Medicaid-based HMOs serving distinct markets. The clearest example supporting Model III is Hawaii, where both Kaiser and the Hawaii Medical Service Association (HMSA) experience low utilization. Although HMSA is nominally a Blue Shield plan, it exercises rather stringent controls over utilization and thus, in some ways, acts more like an IPA or a Health Care Alliance (Christianson 1978). The history of HMSA, however, beginning with its founding by local social workers, combined with the Hawaiian heritage of plantation-provided medical care, suggests that the HMSA behavior may be due more to its special history than to competition with Kaiser (Bailey 1971). The ICF study of HMO premiums for federal employees also offers some support for the competitive cost-containment argument by showing slower growth in premiums in markets with competing HMOs than those with a single HMO (ICF, Inc. 1976). Unfortunately, this study investigates only eight market areas and alternative explanations exist for much of the observed behavior (Enthoven 1978a, p. 346).

Christianson (1978) offers a detailed description of competition among seven HMOs in Minneapolis-St. Paul. All but one of these HMOs has been formed within the past five years, however, and Christianson's focus is primarily on the behavior of the HMOs, rather than the long-term responses of conventional providers. Similarly, IPAs have often been formed in response to PGPs, but the outcome of such competition is still unknown (Lavin 1978; Meier and Tillotson 1978; Christianson and McClure 1978; Dietz 1978a, 1978b; Knox 1978; Enright 1979). Zelten (1977) reports that conventional insurers dropped their rates in response to the entry of a new HMO in Tucson. This type of predatory tactic to drive out non-conventional providers may also have been used in the 1930s and 1940s by the Oregon State Blue Shield plan to drive out health insurers involved in aggressive cost-control activities (Goldberg and Greenberg 1978). Similar actions may explain an unusual rate freeze by Nebraska Blue Cross-Blue Shield after the opening of an HMO in Lincoln (Miller 1979).

The Minneapolis situation has been highly publicized as an example of vigorous competition and rapid HMO growth (Christianson 1978); it therefore warrants further examination. The market share of HMOs grew from two percent in 1972 to four percent in 1975 to ten percent in 1978. More importantly, this occurred through the establishment of six new HMOs, widespread dual choice among major employers, and much visibility. The potential for savings is also present; the HMOs average about 550 hospital days per 1000 enrollees, 38 percent below the Blue Cross group average of 885. Yet, between 1975 and 1977, HMO enrollment doubled as overall hospital utilization in the Minneapolis-St. Paul metropolitan area stayed constant or increased slightly (American Hospital Association 1976-1978). Even ignoring a competitive effect, if the new HMO enrollees actually experienced a 38 percent reduction in hospital use, there should have been an area-wide decline of 14 days per 1000. Obviously, many factors can explain this result, but it is consistent with both the notions of no major competitive response and the selective enrollment of low utilizers in HMOs (Model IV). New data for 1978 indicate a downturn in hospital use in the Twin Cities (Ellwein 1979). However, it is noteworthy that large declines occur for Medicare beneficiaries, who are served by conventional fee-for-service practitioners. This may reflect a very effective competitive response carrying over into general modes of practice, or it may indicate the importance of entirely unrelated factors, such as PSROs.

At first glance, additional support for the competitive model comes from Rochester, New York where intense competition exists between several HMOs and the local Blue Cross-Blue Shield plan. The inpatient medical-surgical utilization rate for Blue Cross-Blue Shield members under 65 years of age was relatively constant from 1974 to 1977 at about 625 days, then dropped precipitously to 547 by mid-1979, a decline much larger than any other Eastern Blue Cross plan. Blue Cross of Rochester attributes much of this decline to a competitive effect (Stewart 1979). There are a number of alternative explanations, however. First, Rochester has had aggressive health planning since the late 1940s, and traditionally has had a very low ratio of beds per capita. It also has an actively interested group of large employers who are encouraging innovation and cost control (Von Berg 1972). A rather unique regional budgeting strategy is in the process of being implemented (Sorensen and Saward 1978). Finally, changes in New York State policies towards nursing home reimbursement have made it more difficult to transfer Medicare and Medicaid recipients out of hospitals. Given the tight bed supply, such policies could force down the Blue Cross-Blue Shield utilization rate (Wersinger 1979).

Model IV — Divergent Trends in Performance Due to Self-Selection in a Competitive Environment

Any dual or multiple choice situation carries the potential for self-selection by enrollees of the plan they see as most beneficial. For a dual choice health policy to work, such self-selection must be relatively minor. Otherwise, the plan attracting high utilizers must be able to constrain their demand or face higher costs leading to higher premiums and an increasingly expensive enrollment mix as its relatively low utilizers leave for less expensive coverage. Little research has examined either the extent or impact of self-selection. Three case studies, however, provide some insight. In two, both involving new prepaid plans, the adverse selection was so severe that the plans failed.

Beginning in 1973, three new HMOs were offered to certain employee groups in Rochester, New York. Two of the HMOs were group practices while the third was an IPA-type plan sponsored by the

Medical Society of Monroe County. This Monroe Plan, as it was called, included somewhat more than half the physicians in the area. All three HMOs provided much more complete ambulatory and maternity coverage than Blue Cross, although at somewhat higher premiums. Those people joining the Monroe Plan were high utilizers even under their previous Blue Cross coverage. These factors interacted, particularly for services without good coverage under the basic Blue Cross plan, such as obstetric and psychiatric services. Monroe Plan enrollees increased their use of these services by 143 percent (Roghmann *et al.* 1977). Similarly, their fertility rate was almost five times that of women enrolled in Blue Cross. With utilization differences of this magnitude, costs rapidly escalated, premiums grew rapidly relative to the other plans, enrollment fell, and the Monroe Plan went out of existence in 1976.

A somewhat similar chain of events seems to be taking place in the Project Health experiment in Portland, Oregon. Project Health has been designed to enable the poor and near poor to enroll in mainstream HMOs and conventional health insurance plans. Premiums are subsidized according to income, but are higher for more costly plans. Even with this deterrent, it seems that the high utilizers differentially have chosen the plan sponsored by Oregon Physicians' Service. This result is not surprising given the important role that prior physician relationship often has in choice of plan. However, the magnitude of the selection effect is larger than anticipated. The hospitalization rate is over ten times that of Project Health enrollees in Kaiser (Neilson 1979).

A recent study of University of California employees demonstrates rather clear price sensitivity in enrollment choice (Piontkowski and Butler 1980). In response to consistently higher Blue Cross premiums, Kaiser enrollment has more than doubled, from 7,500 in 1967 to 15,500 in 1978, while Blue Cross enrollment has remained stable at about 9,200. The more interesting issue is on the cost side. Between 1971 and 1978 the Kaiser premium rose 78 percent, while the increase for Blue Cross was nearly twice that (146 percent). By 1978, the additional premium cost to the employee choosing Blue Cross rather than Kaiser was $246 for single coverage and $551 for family coverage.

One cannot translate the Kaiser premium into expenditures because it is based on a community rate, representing the experience of all Northern California Kaiser members. The Blue Cross premium, however, reflects the University of California experience and suggests that the stable group of enrollees increasingly was composed of high utilizers. This conjecture is supported by what has occurred at Stanford during the same period. Enrollments and premiums in both Kaiser and Blue Cross at this university grew at about the same rate, suggesting that the widening differential at the University of California reflects a shift in enrollment mix, rather than general cost increases faced by all Blue Cross enrollees. The reasons for the different patterns at the two universities is not yet clear, but they probably relate to different patterns of employer contributions and their effects on net premium cost of the enrollee.

SUMMARY AND POLICY IMPLICATIONS

The market effects of HMOs are probably the major reason for policy interest in HMOs. Although HMOs have substantial effects on their members, their limited enrollment in most areas of the country has meant that they have not had a direct impact on health costs nationwide. However, if HMOs engender a competitive response from conventional providers, then even modest HMO enrollments may have a major impact nationally. Enthoven's Consumer Choice Health Plan and Senator Durenberger's proposed legislation both envision major benefits from competition between HMOs and conventional providers (Enthoven 1978b; Durenberger 1979).

The evidence obtained from various studies on the market effects of HMOs is far from conclusive. Of the four models that have been outlined, Models I and III describe situations in which the competition between one or more HMOs and conventional providers leads to the containment of utilization and costs. An alternative type of reaction (Model II) is perverse in that competition leads to increasing total costs. Finally, a fourth model identifies self-selection as a key factor in cost differences and suggests that expanding competition among plans may lead to socially undesirable experience rating. Evidence has been presented to support and to contradict each of these models. Unfortunately, the research is still far too fragmentary to arrive at even a tentative conclusion regarding the impact of HMOs on cost containment and quality of care.

Although the long debate about National Health Insurance and other health care issues has provided time for researchers to collect data to help formulate policy decisions, such decisions rarely wait for conclusive empirical evidence. Given the state of uncertainty about the effects of HMOs on the medical care market, what suggestions might be offered to decision makers currently seeking a cost-containment strategy?

The inconclusive evidence argues strongly against any irrevocable strategy. Instead, a strategy should allow mid-course corrections as new evidence is collected concerning HMO market performance. In general, it appears worthwhile to encourage HMO development and, more importantly, to help structure an improved competitive environment through a mixture of regulatory and market approaches. Regulations may be necessary to require uniform reporting by all types of plans to allow consumers to make direct comparisons between HMOs and conventional insurers. Other regulations may be necessary to require employers to offer more HMO options than the two currently specified under federal law. The health insurance market should be made more competitive by changing current tax incentives so as to disallow complete deductibility for expensive health options. (Various proposals by Durenberger (1979), Enthoven (1978a, 1978b), Schweiker (1979), and Ullman (1979) for such legislation are under consideration.)

Existing regulatory agencies, such as Health Systems Agencies and rate review bodies, can use their current powers to reduce the likelihood of undesirable Model II or IV outcomes. One of the concerns under Models II and IV is that the excess hospital capacity resulting from HMO growth may be utilized inappropriately or be translated into higher costs. To prevent this as HMOs seek to expand or to develop facilities, HSAs might encourage the sale or leasing to the HMOs of existing hospitals with low occupancy. Similarly, rate regulators might prevent hospitals that lose patients to HMOs from increasing their rates in lieu of reducing capacity.

The uncertainty about potential HMO performance, coupled with the potential for undesirable competitive outcomes (Models II or IV), suggests the need for governmental oversight. The need for regulation exists not just within the HMO area but throughout the health industry. For instance, one can point to scandals with the "Medicaid mills" and the so-called Medigap insurance policies as examples of fraud and market abuse. However, the existing insurance laws in most states may not be appropriate for monitoring the operations of HMOs. State insurance departments are usually concerned with net equity requirements and the legal wording of contracts, rather than marketing behavior, financial dealings, or the actual quality of the medical services.

Governmental oversight should be conducted with the intention of monitoring, rather then prescribing, market performance. Intervention should be limited to instances of fraud, abuse, and market failure. Whereas the government should collect and publish the data necessary to review and compare HMO performance, the press and consumer groups should take an active role in publicizing difficulties revealed in the data. The watchdog role of the public and private groups must be supported with prompt corrective action by the government. This strategy is important to protect the integrity of an otherwise socially beneficial program by weeding out the occasional failure or problem. The political ramifications of not monitoring a pro-competitive strategy can be seen in the continued emphasis by HMO opponents on the California Prepaid Health Plan fiasco of the early 1970s.

In conclusion, this overview of the market effects of HMOs suggests that, while the potential advantages of encouraging HMO competition may be great, there are also some potential dangers. This realization leads to the concern for careful monitoring of the medical care market. Although the long-term goal is enhanced competition, the appropriate strategies include not only a reduction of disincentives (e.g., tax subsidies to expensive plans) but increased regulation to encourage competition.

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Developing a Regulatory Strategy Consistent With a Competitive Health Care System *by Jon B. Christianson and Walter McClure**

INTRODUCTION

The case for increased competition in the delivery of medical care has been stated forcefully by a number of authors (Ellwood 1978; Enthoven 1979b; Havighurst 1979; McClure 1978a, 1978b). Most often, these authors visualize numerous prepaid medical care delivery organizations competing for consumers with traditional insurers and providers.[1] However, competitive markets of this type have been slow in developing.[2] The limited number of real-world examples of competitive health care markets can be explained partially by existing regulations which have discouraged their development. This effect has been inadvertent for the most part. Certainly, a comprehensive pro-competitive regulatory strategy for medical care has never been implemented. The purpose of this paper is to outline such a strategy. The first part of the strategy involves modifying those existing regulations that could adversely affect the development of competitive market conditions. The second part addresses the problem of integrating competitive markets that develop with existing and potential "command and control" types of regulation.[3]

The first section of this paper briefly describes the market structure and characteristics necessary for competition. In the second section, selected existing regulations that could adversely affect the development of this structure are identified and the suggestions of the

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[1] All exponents are agreed on the necessity of "fair market choice"--i.e., giving consumers a multiple choice of plans under fair market conditions--but differ in nuance on the competitive arrangements in this market. Ellwood advocates that most medical care be provided by prepaid health care plans, whereas Havighurst and Hackbarth emphasize a diversity of negotiated insurer-provider agreements. Enthoven and McClure fall in between, advocating greater pluralism in both health care plans and arrangements between conventional providers and health insurance plans, but McClure stresses that health care plans are necessary to engender the provider competition that will make possible more flexible conventional insurer-provider agreements.

[2] See Christianson and McClure (1979) for a description of a competitive market which does appear to be developing in the Minneapolis-St. Paul area. Also, Goldberg and Greenberg (1979) describe competition between Blue Cross and Blue Shield and Health Maintenance Organizations in California and Hawaii, while Christianson (1980) contrasts the impact of Health Maintenance Organizations on traditional providers in Denver, Hawaii, and Minneapolis-St. Paul.

[3] Schultze (1977) first coined the term "command and control" regulation. As applied to medical care, we use the expression to encompass controls on physician fees, hospital charges, medical practice styles, purchases of equipment by physicians and hospitals, and the like.

authors and others for changing these regulations are summarized. The concluding section of the paper describes a general approach to integrating competitive markets with command and control regulatory systems, emphasizing the key role that the concept of "exemption" can play in this integration.

AN IDEAL COMPETITIVE MARKET: STRUCTURE AND CHARACTERISTICS

The failure of the present medical care system to perform acceptably, particularly in restraining cost increases, has been the subject of extensive analysis. There now appears to be widespread agreement on the central flaw in the existing system: there is little reward for consumers who choose efficient providers or for providers who are cost-effective in their practice of medicine. For example, whether an individual enters the most expensive hospital or the lowest cost hospital, his insurance is likely to pay most of the cost and his insurance premium will not be affected by the choice. When providers order fewer services for their patients (even though fewer services may be appropriate), their income suffers since the existing reimbursement system pays them less; their efficiency is irrelevant and even invisible to consumers.

Advocates of competitive markets believe that restructuring these incentives is crucial to improving the performance of the medical care system. This can be accomplished, they argue, by creating sets of providers that consumers can choose from such that the premium paid by each consumer reflects the efficiency of the providers chosen (McClure 1978a, 1978b). We will refer to these sets of providers as "health care plans," a generic term that includes, but is by no means limited to, Health Maintenance Organizations (HMOs). Health care plans are distinct from traditional health insurance plans since they actually provide care--health insurance plans only pay for it. Each health care plan can be organized in any way that participating providers wish. Therefore, the plans can accommodate most existing practice arrangements, including solo practice and fee-for-service reimbursement, with minimal modification. The most important feature of the plans in stimulating competition is that they distinguish between specific sets of physicians and hospitals, with a separate premium for each. The consumer picking the more efficient set of providers is rewarded by a lower premium and/or greater benefits. The attractive and efficient provider groupings are rewarded by enrollment growth. In this way incentives for cost consciousness on the part of providers and consumers are created.

Using this basic idea and some well-known economic principles, one can postulate the characteristics of an ideal competitive market in medical care. First, it is desirable to have a variety of health care plans co-existing with traditional providers and insurance plans in any given market area. If health care plans are numerous, the potential for collusion among plans in the determination of benefits and premiums is reduced. Collusion also would be less likely to occur if the health care plans had sponsors of many different persuasions. A variety of non-colluding health care plans would insure that many different combinations of provider premiums, benefit coverages, services, and geographic locations evolved as consumer options.

In addition to having a number of existing health care plans, the ideal competitive market should have few barriers to the entry of new plans. Barriers to entry in any economic market tend to stifle innovation because they raise the cost to the innovator of marketing his "better idea". Therefore, they protect existing health care plans from potential competition. The threat of the entry of new health care plans into the market helps keep existing plans responsive to consumer desires and encourages the adoption of efficient methods as soon as they become available.

In order to expose the entire medical community to the restraints of competition, it is desirable to have a substantial proportion of providers affiliated with health care plans in some fashion. There is no "magic number" in this regard. The "correct" proportion in any market area is that fraction which leads to effective competition. However, two important conditions concerning provider participation must be met if competition is to be achieved. First, a single health care plan should not encompass all or most of the providers in a community. In any economic market, such a monopoly is the antithesis of competition. Second, physicians should not participate simultaneously in several plans. Loss of patients is one of the most powerful factors in motivating physicians to compete through adoption of more cost-effective practice styles. If a physician is affiliated with two plans simultaneously, the switch of a patient between the plans would have little effect on that physician. Under these conditions there is limited potential for competition among plans to change physician practice patterns.

The existence of numerous diverse health care plans does not guarantee that effective competition will develop among the plans and between the plans and traditional providers. It is also necessary that consumers have the freedom to choose among the available plans. Since for most consumers this choice occurs in the work setting, employers in the ideal competitive market would offer multiple health care plans to their employees along with traditional insurance plans. In addition, the public sector would make multiple health care plans available to the groups for which it serves as the "gate keeper": government employees and Medicare and Medicaid recipients.

Given equal access to potential enrollees, full exploitation of the potential benefits of competition requires that the "rules of the game" be similar for all health care plans and insurance plans. That is, restrictions on benefits, premiums, and the enrollment process should not be imposed on any type of plan unless they are imposed on all types of plans. In general, these restrictions should be kept to a minimum to allow the evolution of those combinations of benefits, premiums, and services desired by consumers.

Finally, in the ideal competitive setting the consumer is rewarded for the choice of a less costly alternative. This condition does not prevail in the present market for medical care. Many employers pay the total value of the health benefit premium regardless of the cost of the option chosen by the employee. Since there is no reward for choosing a less costly plan, premium levels become unimportant in the consumer's choice. Consequently, health care plans and insurers have little incentive to contain their costs. In fact, the incentives for providers under these conditions differ little from those under the present system. Ideally, to facilitate competition, the employer would pay a fixed amount that the employee could apply towards any health benefit option; the employee would pay, or be rebated, the balance. This would reward the employee for choosing cost-effective providers.

All of these characteristics of an ideal, competitive medical care market need not be present for some degree of competition to occur. However, public policies that hinder the development of this type of market structure also limit the potential for competition to reorient existing consumer and provider incentives and restrain cost increases. Therefore, it is important to identify existing regulations that could restrict the development of competitive markets.

REMOVING EXISTING BARRIERS TO COMPETITION

There are a number of existing public policies that are not conducive to the development of competitive market structures. These policies were not designed intentionally with this as an objective; indeed, the potential for competitive markets to reorient medical care delivery incentives quite probably was unknown or not clear to those formulating the policies. Consequently, provisions exist throughout the accumulated legislation (pertaining both directly and indirectly to medical care) that limit the development of the six desirable competitive market characteristics outlined above. These provisions have been identified, and remedies suggested, by a variety of authors. In this section, we briefly summarize this literature as it pertains to the following areas: The HMO Act, tax law treatment of health care benefits, Medicare reimbursement provisions for prepaid plans, hospital rate review, and the National Health Planning and Development Act.

The HMO Act of 1973

The HMO Act was passed with great expectations that it would facilitate the development and acceptance of prepaid health care plans. However, the provisions of the Act were too restrictive to accomplish its goals. In his analysis of the HMO Act, Starr (1976) observed:

> As originally passed, the Act required of qualifying HMO's a relatively broad range of minimum services, a relatively narrow range of organizational characteristics, and an added burden of administrative expense. These requirements, in their combined

> effect, threatened to make it difficult for programs to offer premiums at a competitive price. . . . The Act denied a plan the ability to offer lower-priced contracts with more limited benefits to meet the purchasing power of lower income workers. . . . The result was that qualifying plans would virtually be barred from serving a large segment of the public. (p. 76)

In addition to this problem, qualifying plans were required to use a "community rating" system for all subscribers and to allow "open enrollment" periods each year. Again, according to Starr (1976, p. 77), "Community rating and open enrollment are, no doubt, desirable policies that all insurers should follow as well, but to establish these requirements for HMO's alone was markedly discriminatory."

In the end it appears that the HMO Act discouraged diversity among prepaid plans, made it difficult for new plans to enter the market (since employers tended to equate "federal qualification" with "certification" and consequently viewed plans without qualification as inferior), imposed discriminatory "rules of the game" as conditions for qualification, and imposed restrictions on the variety of options that prepaid plans could offer enrollees. For all of these reasons, the Act discouraged the development of competitive markets.[4]

McClure (1978b) has suggested that, even though its more restrictive provisions were modified in 1975, the HMO Act is still much too narrow to be useful in stimulating the development of competitive markets. He favors reorienting federal policy to promote competition among all health care plans and conventional providers and insurers rather than simply promoting HMOs. For the purposes of public policy, a health care plan would be broadly defined as any organization that:

- provides (or arranges to provide) a specified set of medical services (when medically appropriate) to a defined set of voluntarily enrolled consumers;
- includes no more than some fixed percentage (say 50 percent) of practicing physicians in a medical service area within its set of participating providers; and
- establishes as its basic mode of payment for services by enrollees a fixed periodic premium or capitation payment (with no limitations on the manner in which providers are reimbursed).

This definition encompasses a much wider range of organizations than designated in current state and federal "HMO Acts," yet delineates the characteristics of a provider grouping essential to the promotion of competition. The details of a public policy centering on the promotion of health care plans are described at length by McClure (1978b).

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[4] One provision of the Act--"dual choice"--was designed to encourage competition by giving federally qualified HMOs greater access to employee groups. Firms that had 25 or more employees and that offered a health benefits plan were required to offer as well a qualified HMO if so requested by the HMO. According to Starr (1976, p.77), "The dual choice provision, which should have given HMO's access to consumers, turned out to have the opposite effect in the short run." This result was primarily due to delays in issuing dual choice regulations and the difficulties that confronted existing prepaid plans in achieving "federal qualification."

Tax Treatment of Health Insurance Benefits

The provisions of income tax laws and Social Security laws, as they relate to employer paid health insurance premiums, have been extensively analyzed (see, for instance, Feldstein (1973) or Havighurst (1977)). The key characteristic of these laws is that they treat employer contributions for health care benefits as non-taxable employee income. Therefore, employees have an incentive to pay for their medical care as much as possible through insurance. This incentive can have important implications for the development of competitive markets.

Enthoven (1979a) and Havighurst (1977, 1979) both argue that the incentive created by favorable tax treatment for health care benefits can contribute to ever-increasing comprehensiveness in benefits and to greater employee pressure on employers to pay the entire employee health benefit premium. As a result, "When the employer pays 100 percent of equivalent comprehensive benefits either in the fee-for-service sector or to the HMO, the employee is deprived of an important financial incentive to choose a less costly plan" (Enthoven 1979a, p. 28). As observed earlier in this paper, for competitive markets to develop it is essential that the consumer be rewarded for the choice of a more efficient plan. Therefore, the structure of the existing tax laws has not been conducive to the development of competitive markets.

Havighurst (1977, p. 476) has observed that "repeal of favorable tax treatment for premiums is politically impossible," but that the situation could be remedied by "introduction of an upper limit on the employer-paid premiums." However, in preference to this option, he suggests that "a limited credit against the employee's taxes for employer- and employee-paid premiums on his private health insurance" be adopted (Havighurst 1977, p. 476). Enthoven (1979a, p. 29) endorses this proposal, adding that "the use of a refundable tax credit would also channel more medical purchasing power to lower income groups."

McClure has recently proposed a somewhat different, "carrot and stick" approach to solving the problem. He advocates granting favorable tax treatment for employer-paid premiums only if the employer offers several different plans and makes the same cash contribution to whichever plan is chosen (Havighurst and Hackbarth 1979).[5] Furthermore, when a lower priced plan is chosen, employees could be given the savings tax-free. Reform of the current tax laws along these lines could be used to introduce greater choice for consumers among health benefit options and to strengthen the consumer's reward for considering costs in making that choice. This presumably would stimulate the development of more health care plans and increase the degree of competition among available plans.

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[5] McClure's original proposal was to legally require employers to offer this "fair market multiple choice." McClure is indebted to Enthoven for suggesting that the choice be conditioned through favorable employer tax treatment.

Havighurst and Hackbarth (1979) note that the McClure proposal has the advantage of being politically attractive:

> Members of unions or other groups now accustomed to high-priced benefits would not face higher taxes under this system, as they would under other systems of tax reform. Even if the tax treatment of employer contributions is not changed so that employees can capture any savings tax-free, McClure's proposed change would still be beneficial. (p. 1305)

Medicare

The medical expenses incurred by eligible Medicare recipients are reimbursed on a "cost-plus" basis. When prepaid health care plans compete with fee-for-service providers for Medicare patients, this reimbursement system subsidizes the more costly option. Medicare beneficiaries have no incentive to seek out less costly options, and physicians are not rewarded for participating in such options. Hence, an essential characteristic for the development of competition among health care plans and traditional insurance plans is missing.

The present Medicare reimbursement mechanism has implications for competition that extend beyond the Medicare beneficiary group. Suppose that a competitive market were established in the employed, under-65 population. The Medicare population could provide an escape valve for the competitive pressures on providers which would build up in this market. It is possible that providers would then turn to the cost-based reimbursement of the Medicare system to "make-up" for lower revenues generated by the employed population. The potential for competition to constrain overall community health care costs would be reduced.

It has been suggested that Medicare enrollees be rewarded for choosing more efficient plans in either of two ways: increased benefits or the rebate of at least a portion of the differential cost (Enthoven 1979a). Although these solutions appear relatively simple in principle, there are important problems of implementation. At what level should the rebate be set? How much should health care plans (assuming they are the efficient providers) be rewarded for their efficiency? How well will Medicare recipients be able to judge the dollar value of additional benefits? These questions are now being debated in Congress, where legislation has been introduced that would alter current Medicare reimbursement procedures along these lines.

Hospital Rate Review

Hospital rate review programs, developed and administered at the state level, can be significant factors in defining the role that hospitals play in the development of competitive markets. Since the provisions of these programs vary on a state-by-state basis, only their general implications for competition will be discussed here.

Competition among health care plans and traditional providers affects hospitals since it presumably reduces hospital utilization. Health care plans in a competitive market have an incentive to concentrate their patients at the most efficient hospitals; eventually hospitals that are not efficient will be forced to consolidate or close. Therefore, one would expect the development of a competitive market structure to reduce total community hospitalization and, eventually, hospital capacity and reallocate patients among community hospitals.[6]

A hospital can actively participate in a competitive market by sponsoring a health care plan with hospital medical staff as the provider group and/or by forming contractual affiliations with existing health care plans. These actions funnel patients to the hospital, enabling it to maintain its census and revenues even in the face of falling community-wide hospitalization rates. The success of either effort depends, in part, on the ability of a hospital to provide low rates for health care plan patients or to assume a portion of the risk of their hospitalization expenses. In this respect, the hospital can be limited by the decisions of the hospital rate review program.

One of the many objectives of rate review is the maintenance of "equitable" rate structures for individual hospitals. In practice this means that rate review programs often require all rates to be based on the accounting costs of providing services. This policy precludes hospitals from giving discounts to health care plans unless the discounts can be "cost justified" and, more importantly, limits risk-sharing arrangements between hospitals and health care plans. Therefore, hospitals are constrained in the role that they can play in the development of competitive markets, and the potential for competition to restrain hospital cost increases is reduced. However, it is not eliminated. Health care plans still benefit from seeking out efficient hospitals, and therefore hospitals can still benefit from their cost effectiveness in a competitive market.[7] In states where hospital rate review programs and competitive market structures coexist, statutory provisions allowing a greater range of contractual arrangements between hospitals and health care plans would be desirable, if such arrangements would facilitate competition. Hospital rate review boards also should be sensitive to attempts by hospitals to use the rate setting process as a means of limiting the competitive impact of health care plans.

Health Planning

Certificate-of-Need regulation now is required in every state by the National Health Planning and Resources Development Act, with administrative responsibility resting with local Health Systems Agencies. These agencies have the right of review and approval for selected capital expenditures by providers. However, their actions have not had an equal impact on health care plans and traditional providers. Prior to the Planning Act, Certificate-of-Need review was authorized on a state-by-state basis. In many states, construction of ambulatory care facilities by health care plans was subject to review and approval, while the construction of identical facilities by fee-for-service providers was not. In fact, McClure has argued that all capital controls fall more severely on health care plans than on traditional providers. These plans

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[6] See Christianson and McClure (1980) for a more detailed discussion of the potential for competition among health care plans to restructure the market for hospital services.

[7] Christianson (1979) provides evidence on how hospitals and health care plans adapted to hospital rate review in one market.

> . . .must perform a delicately timed balance between enrollment and health care resources: too few resources mean consumers will disenroll for lack of service; too many resources mean premiums (or losses) will mount to uncompetitive levels. The time and legal delays of Certificate-of-Need and Section 1122 review imperil this balancing act. (McClure 1978b, pp. 322-323)

Moreover, McClure (1978b) argues that all capital controls on health care plans are superfluous since experience demonstrates that health care plans do not acquire unnecessary capacity. Consequently, he recommends that all organizations meeting his definition of a health care plan be exempted from all Certificate-of-Need requirements.[8]

Health planning agencies can affect the development of competitive market structures in more subtle ways. In administering Certificate-of-Need regulations, health planners focus on preventing unnecessary and wasteful duplication of facilities. This concern for duplication often appears to carry over to decisions concerning the desirability of new health care plans in their communities. Seidman (1978) has cited cases where Health Systems Agencies have ruled against new plans partially on the grounds that they provided services that were already offered by traditional providers. In these cases the planning process was used as a barrier to market entry for new health care plans. Removal of this obstacle to the development of competition would require either legislation exempting health care plans from the health planning process or widespread education of HSA boards and staff.

INTEGRATING COMPETITION WITH REGULATION

The previous section of this paper identified public policies that potentially inhibit the development of competitive markets, and suggested how they might be revised. The discussion was not exhaustive. For instance, a redefinition of Medicaid reimbursement formulae or a vigorous application of anti-trust law to the medical marketplace might also aid in the establishment of competitive market characteristics. These alterations of existing laws and regulations, along with prescriptions for stimulative actions by business, labor, medicine, and government, have come to be known as the

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[8] Recent amendments to the Planning Act exempt only federally qualified HMOs from these requirements.

"competitive strategy" or "market strategy" for reform of the medical care delivery system.[9]

Although the competitive strategy is technically possible, there are two practical stumbling blocks to its successful implementation. First, a number of areas in the United States already have strong regulatory frameworks in place. It seems unlikely that these areas would provide fruitful ground for the development of competition, even were the competitive strategy adopted. Once providers have adjusted to regulatory procedures, they may find it unsettling and even threatening to adapt to changes in the rules designed to facilitate increased competition. Thus, they could be expected to oppose vigorously the implementation of the competitive strategy in their communities. Also, this strategy implies a diminished role for the regulatory bureaucracy, a change in status which it would, quite predictably, resist. This resistance could take the form of prejudicial regulation of health care plans relative to conventional providers.

A second consideration limiting the potential success of the competitive strategy is its implicit assumption that only existing regulations adversely affecting competition need alteration. In fact, even in areas where regulation is not well entrenched, there will be continuing pressures by advocates of regulation to increase its scope. One cannot expect these advocates to possess a great deal of understanding or sympathy for the competitive approach. Therefore, it seems likely that new regulations would provide a continuing list of anomalies that would require "correction" in order to stimulate competition. The list provided in the previous section would grow ad infinitum. Correcting these regulatory biases with a case-by-case approach would require considerable time and effort, during which the competitive approach might be hopelessly compromised.

If the competitive strategy is to be given a reasonable trial, competitive markets and providers must be allowed to coexist with regulation, without being adversely affected by it. Two possibilities for accomplishing this are offered here. The competitive market strategy could be adopted as the sole national policy with the provision that if, after a certain number of years, the strategy had not progressed or performed satisfactorily, policy would shift to a command and control regulatory strategy. Call this the "sequential approach." Alternatively, national policy could proceed incrementally on both the competitive and regulatory approaches simultaneously, avoiding actions on one strategy that would inhibit or undermine the other, unless or until experience shows one strategy definitely superior to the other. Under this procedure, which can be called the "simultaneous approach," all providers not subject to effective competitive market incentives would be liable to command and control regulation, whereas all providers subject to effective competitive incentives would be entirely exempt from this type of regulation.

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[9] Enthoven (1979a, 1979b) has linked the market strategy with a specific national health insurance plan. However, it also can be pursued on its own merits independently of national health insurance, or as a precursor to national health insurance.

Providers could choose individually which type of restraint they applied to themselves, by meeting or not meeting the conditions of the exemption. However, they could not avoid some type of effective cost constraint, as they can under the present system.

Each of these approaches has its strengths and weaknesses. A major advantage of the sequential approach is that initial policies promoting competitive markets would not impede a shift to the regulatory strategy at a later time, should it become necessary. Further, the sequential approach might even contribute to the success of the regulatory strategy. The initial market strategy effort would not create large public bureaucracies that would have to be dismantled should the strategy prove ineffective. Because health care plans are potentially easier to control by price regulation than are conventional providers, the more health care plans established before the shift to regulation, the easier the regulatory task might be. Also, to the extent that incentives are changed through market oriented policies, the task of subsequent regulation would become easier. Finally, we note that one of the greatest obstacles to the market strategy is the motivation of sufficient numbers of physicians to organize health care plans. An imminent deadline for regulation, should the market strategy fail, might help motivate physicians in this respect.[10] Despite these strengths, the sequential approach has a serious drawback. Apart from technical problems of implementation, it is politically naive. It is unrealistic to expect advocates of regulation to stand still while the market strategy is tried, or advocates of competitive markets to step aside gracefully if the market approach does not yield satisfactory results. Thus, unless widespread support for the competitive strategy emerges, the political chances for a sequential approach may be dim.

The simultaneous approach might help reconcile advocates of competition and regulation if a political stalemate occurs. The exemption concept allows both strategies to proceed simultaneously, yet virtually independent of each other. This is an important political consideration, given the potential conflict between the competitive and regulatory strategies. Advocates of both strategies could attempt to implement their preferences in whatever manner they wished without fear of foreclosing the other option, but no provider would be allowed to escape some form of expenditure restraint. In this way each area of the nation could develop independently the mix of effective competitive market restraints and regulation that providers and consumers supported. Consequently, the nation as a whole would not be required to make an immediate decision between the competitive market and regulatory approaches. It could test both strategies simultaneously and allow experience to make the decision in each geographical area. Under these conditions it seems likely that the nation's health care system would achieve a mix of competitive market and regulatory cost constraints, with some areas largely market oriented, others largely regulation oriented, and some in between.

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[10] One could argue that an initial regulatory effort would impair a shift to a competitive strategy at a later time, for many of the same reasons that the competitive strategy has limited potential for success in markets where extensive regulation is now present.

Besides having the potential to reconcile the conflict between competitive markets and regulation, the exemption concept has other points to recommend it. For example, given the possibility of exemption, regulation might foster the development of effective competitive markets. The exemption provides both the opportunity and the incentive for providers to behave competitively so as to escape regulation. Conversely, given the possibility of exemption, competitive markets may be supportive of more effective regulation. For instance, if providers object to regulation, it can be defended on the grounds that providers are always free to use the exemption path to avoid it.[11] Also, the vulnerability of regulation to cartel behavior on the part of providers is reduced. One of the weaknesses of the regulatory approach is that politically strong providers sometimes can influence the regulatory process to enforce cartel-like behavior on other providers who, in the absence of regulation, might wish to pursue a different course. The market exemption offers unwilling providers an escape. Finally, the existence of effective competitive markets can provide regulators with otherwise unavailable standards of comparison in defining regulatory goals.

The major drawback to the simultaneous approach is the difficulty of devising reasonable exemption criteria. In fact, one could argue that the success of a simultaneous competitive market/regulatory strategy hinges entirely on the existence of practical criteria that can selectively identify providers and areas subject to effective competitive forces. Obviously, this problem is too complex to investigate in detail within the confines of this paper. (The reader is directed to McClure (1979) for a discussion of specific exemption criteria that appear promising.) However, we can suggest four general guidelines for exemption criteria.

First, the exemption criteria must be selective. The number of providers allowed to slip through the exemption process incorrectly should be negligible. Relatively stringent criteria are necessary if the exemption concept is to be politically viable.

Second, the exemption must be conditional. It should be subject to revocation if an exempt provider fails to maintain the conditions that were necessary to gain the exemption. This constraint would inhibit providers from obtaining an exemption under provisions that they did not intend to maintain.

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[11] The exemption concept can be viewed as an extension of the principle that regulation should be performance-related. According to this principle, regulation should reward producers commensurate with how well they perform and/or penalize producers commensurate with how poorly they perform. Therefore, exemption is simply one more means for regulation to reward well-performing providers by allowing them to escape the burden of regulation itself. If regulation is not performance-related and all providers are regulated no matter how well they perform, then the only incentive on providers is to fight regulation. Performance-related regulation using exemptions provides alternative opportunities and incentives for providers to meet the objectives of regulation rather than to fight them.

Third, the exemption criteria should be as automatic and mechanical as possible. They should be explicit and require no subjective regulatory judgment. The establishment of automatic criteria would make it difficult for regulators and anti-competitive providers to subvert the exemption process.

For much the same reason, administration of the exemption should be entrusted to a government level separate from, and higher than, the regulatory agency. A separate agency might have less at stake and less emotional investment in regulation, and therefore might be more objective in granting exemptions than the agency regulating non-exempt providers.

One final, and potentially very important, problem with the simultaneous approach should be mentioned. Once regulation is available as an alternative to competition, providers may find that they can unduly influence and soften the regulation to the extent that they prefer it to effective competition. If so, no providers would take the exemption, since the regulation would be relatively ineffective in constraining expenditures. Thus, regulation may work better as a threat than as a fact. One remedy to this situation could be to continue to offer the exemption mechanism. In this case, one of two scenarios would develop. First, if regulation is ineffective and costs escalate, efficient providers become potentially that much more attractive to consumers. These providers would anticipate ever increasing rewards to participating in competitive markets; ultimately they would turn to the exemption as a means of exploiting their efficiency. Alternatively, if efficient providers fail to appreciate their market advantage early enough, government will be forced to establish more onerous, and hopefully more effective, cost control regulation. This in turn makes the exemption more attractive to providers. Thus, the competitive market and regulatory strategies eventually would reinforce each other, given that the exemption mechanism is always available.

CONCLUSION

The competitive strategy for health care delivery consists of a collection of public policy changes and private actions that have as their goal the development of ideal competitive market structures. However, as long as competitive providers and markets are subject to command and control regulation, the process of "correcting" regulations detrimental to competition could be frustrating and never ending. Therefore, if a strong enough consensus for the competitive strategy does not emerge, an approach may be needed to allow competitive markets to coexist with strong command regulation, without being adversely affected by it. There are (at least) two theoretically possible, but purely speculative, alternatives available: sequential implementation of the competitive market and regulatory strategies, or their simultaneous implementation with provision for exemption of competitive providers and markets from regulatory cost controls. The sequential approach requires strong political support for the competitive strategy. The simultaneous approach may require less political consensus in favor of competition, but it is not the simple and obvious compromise that it might at first appear to be. It would reduce the incompatibility between effective markets and strong cost regulation only to the extent that the exemption concept is practical and effective. Defining appropriate exemption criteria is a difficult task, but one deserving of the attention of health care analysts and policy makers.

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Part II

Selected Socioeconomic Data on Health

Characteristics of the United States Population

An essential element in any analysis of the health services delivery system is a description of the individuals who demand and receive these services: the consumers of health care. Such a description should encompass both demographic and health characteristics of the population.

Each member of the population is a potential consumer of health care services. Theoretically, demand is generated only by individuals. However, organized third parties such as insurance companies, the government, and labor unions also exert pressure on the demand for health care services. The rising trend in demand for health care services can be partially attributed to such factors as population growth, changes in the age and race composition of the population, increased awareness regarding health, and the ability of the medical profession to provide expanded and improved services. The most influential factors in the rising trend in demand, however, have been those which have enabled purchasers of medical care services to translate their wants into effective demand. Among these factors are increasing income, widespread comprehensive health insurance coverage, and the growth of government subsidies.

The following data provide a summary of the demographic characteristics of the population served by the U.S. health care delivery system.

- As of July 1, 1979, the total U.S. population was estimated at 220,584,000. This figure represents an 8.0 percent increase over the 1970 population estimate.
- Females accounted for 113,093,000 persons, 51.3 percent of the U.S. resident population in 1979.
- The median age of the U.S. population was 30.0 in 1979, up from 27.9 years in 1970.
- The population 65 years of age and over increased from 19,972,000 in 1970 to 24,658,000 in 1979, representing an increase of 23.5 percent.
- The population under 5 years of age is the only segment of the population which has shown a steady decrease in number since 1960, decreasing 23.0 percent between 1960 and 1979.
- The nonwhite population numbered 30,131,000 as of July 1, 1979, representing 13.7 percent of the U.S. population. Females accounted for 52.4 percent of the total nonwhite populace.
- The median age of the nonwhite population in 1979 was 24.9, six years younger than the median of the white population.
- The percentage of households with incomes under $3,000 decreased from 15.8 percent in 1970 to 7.3 percent in 1977.

- In 1977, the median income of white households was $14,272. Nonwhite households had a median income of $8,922.

- Between 1970 and 1977 median income of nonwhite households increased by $3,200, while the median income for white households increased by $5,175.

- In 1977, the median family income in metropolitan areas of 1,000,000 people or more was $18,196, compared to $16,329 in metropolitan areas under 1,000,000 population and $13,789 in nonmetropolitan areas.

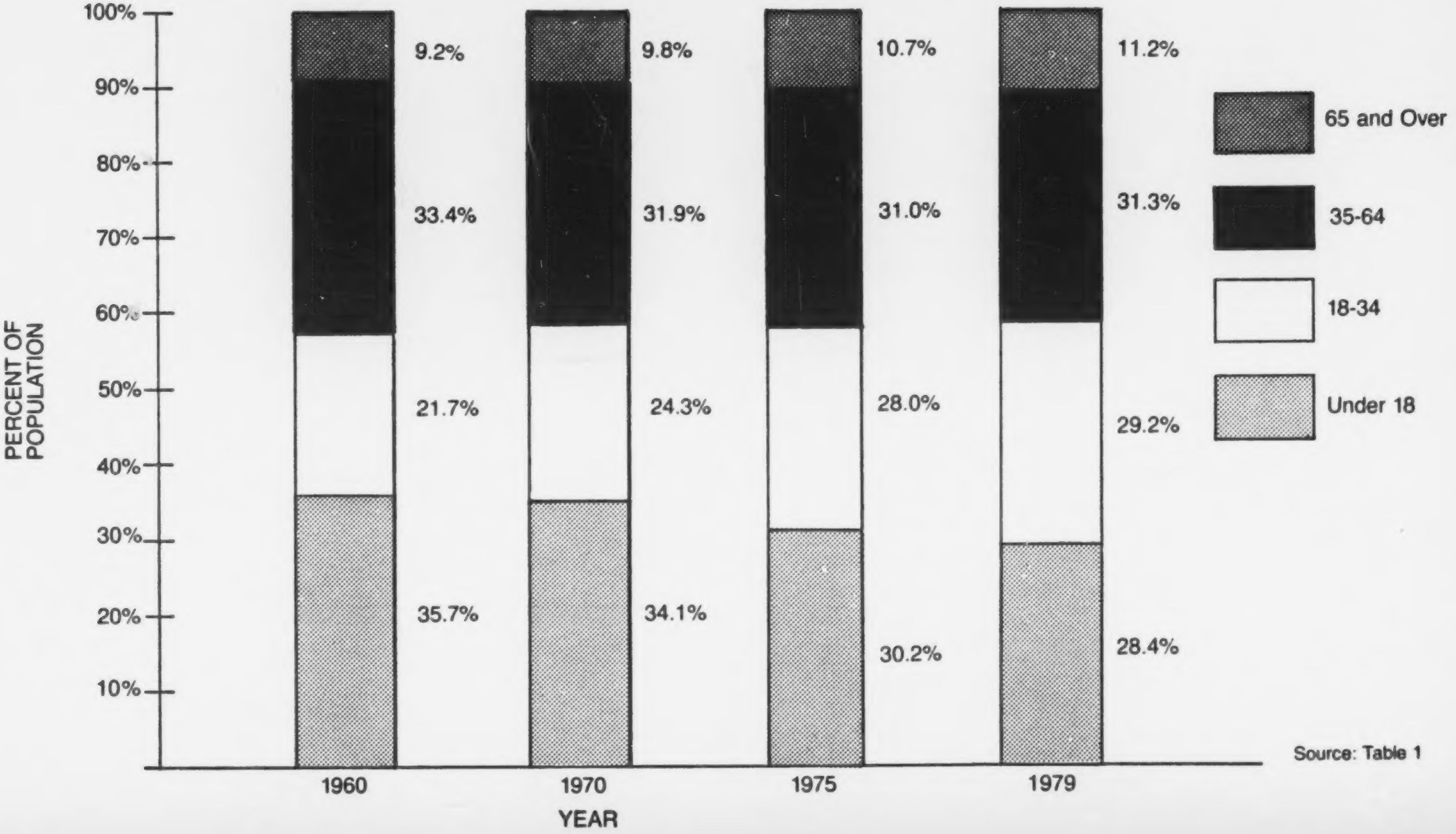
Table 1—Age of the U.S. Population, Percent Distribution, and Rate of Change, 1960, 1970, and 1979

Age (years)	Population (thousands) April 1, 1960	Population (thousands) April 1, 1970	Population (thousands) July 1, 1979	Percent Distribution April 1, 1960	Percent Distribution April 1, 1970	Percent Distribution July 1, 1979	Change 1970 to 1979 Number	Change 1970 to 1979 Percent
All ages	180,007	204,335	220,584	100.0%	100.0%	100.0%	+16,250	+ 8.0
Under 5	20,321	17,163	15,649	11.3	8.4	7.1	- 1,514	- 8.8
5 to 13	32,726	36,675	30,647	18.2	17.9	13.9	- 6,028	-16.4
14 to 17	11,162	15,854	16,276	6.2	7.8	7.4	+ 422	+ 2.7
18 to 24	15,975	24,455	29,285	8.9	12.0	13.3	+ 4,830	+19.7
25 to 34	23,007	25,146	35,024	12.8	12.3	15.9	+ 9,879	+39.3
35 to 44	24,181	23,214	25,136	13.4	11.4	11.4	+ 1,923	+ 8.3
45 to 54	20,503	23,254	22,957	11.4	11.4	10.4	- 296	- 1.3
55 to 64	15,574	18,603	20,952	8.7	9.1	9.5	+ 2,350	+12.6
65 and over	16,560	19,972	24,658	9.2	9.8	11.2	+ 4,685	+23.5
Median age	29.4	27.9	30.0	--	--	--	--	--

Sources: Estimates of the Population of the United States, by Age, Sex, and Race: July 1, 1974 and April 1, 1970. Current Population Reports Series P-25, No. 529 September 1974:1.

Estimates of the Population of the United States, by Age, Race, and Sex: 1976 to 1979. Current Population Reports Series P-25, No. 870, January 1980:3.

Figure 1—Percentage Distribution of U.S. Population by Age, 1960, 1970, 1975, and 1979



Source: Table 1

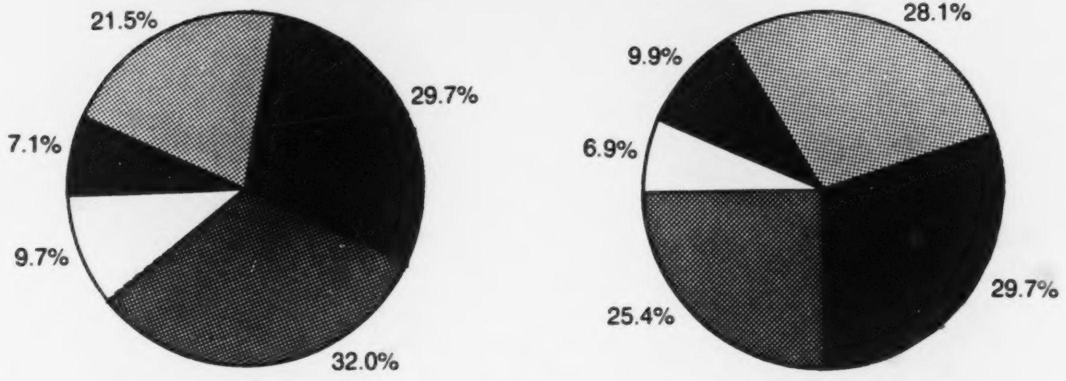
Table 2—United States Population by Age, Race, and Sex, 1979

	Number (thousands)				Percent			
	White		Black and Other		White		Black and Other	
Age (years)	Male	Female	Male	Female	Male	Female	Male	Female
All ages	92,661	97,307	14,345	15,786	100.0%	100.0%	100.0%	100.0%
Under 5	6,585	6,262	1,418	1,384	7.1	6.4	9.9	8.8
5 to 13	12,957	12,359	2,685	2,645	14.0	12.7	18.7	16.8
14 to 17	6,950	6,660	1,349	1,318	7.5	6.8	9.4	8.3
18 to 24	12,425	12,254	2,104	2,246	13.4	12.6	14.7	14.2
25 to 34	15,105	15,083	2,148	2,528	16.3	15.5	15.0	16.0
35 to 44	10,787	11,120	1,425	1,742	11.6	11.4	9.9	11.0
45 to 54	9,870	10,349	1,267	1,465	10.7	10.6	8.8	9.3
55 to 64	8,959	9,914	956	1,123	9.7	10.2	6.7	7.1
65 and over	9,024	13,306	993	1,334	9.7	13.7	6.9	8.5
Median age	29.7	32.2	23.7	26.1	--	--	--	--

Note: Data are estimates of resident population as of July 1, 1979.

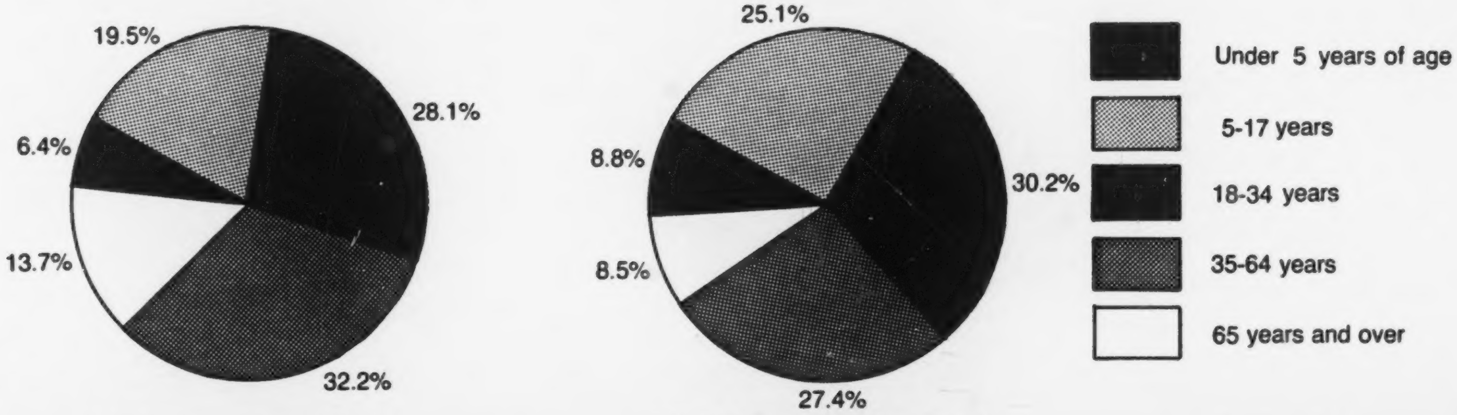
Source: Estimates of Population of the United States by Age, Race, and Sex: 1976 to 1979. Current Population Reports Series P25, No. 840, January 1980:13-14.

Figure 2—Percentage Distribution of United States Population by Age, Race, and Sex, 1979



WHITE MALE POPULATION

BLACK MALE POPULATION



WHITE FEMALE POPULATION

BLACK FEMALE POPULATION

Source: Table 2

Table 3—Households by Total Household Income and Race of Household Head, 1970 and 1977

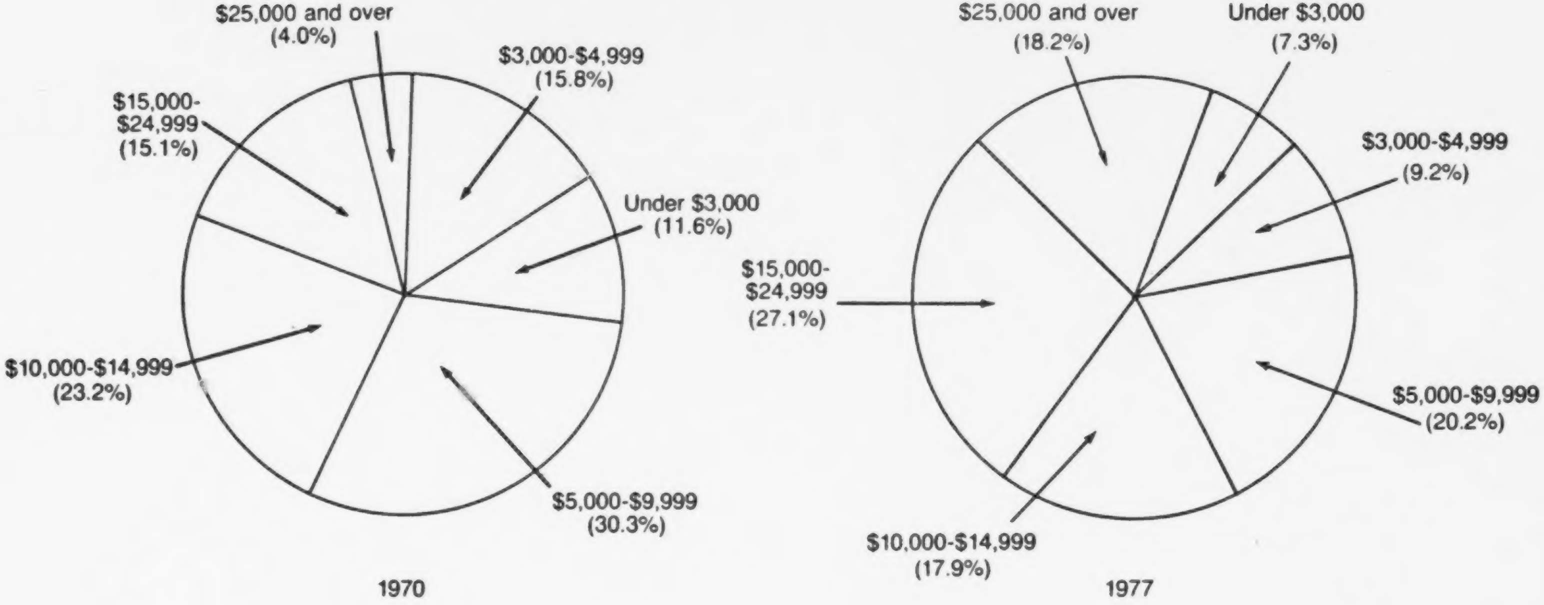
Total Household Income	1970[a]			1977		
	All Races	White	Black and Other	All Races	White	Black and Other
Number Persons (thousands)	64,778	57,575	6,800	76,030	66,934	9,095
Percent	100.0	100.0	100.0	100.0	100.0	100.0
Under $3,000	15.8	14.5	27.2	7.3	6.3	14.5
$3,000 to $4,999	11.6	11.0	16.8	9.2	8.5	14.1
$5,000 to $6,999	11.8	11.4	15.2	8.5	8.0	12.5
$7,000 to $9,999	18.5	18.7	16.6	11.7	11.4	14.0
$10,000 to $11,999	11.0	11.4	7.7	7.2	7.2	7.5
$12,000 to $14,999	12.2	12.7	7.2	10.7	10.9	9.6
$15,000 to $24,999	15.1	16.0	8.1	27.1	28.3	19.1
$25,000 and over	4.0	4.3	1.3	18.2	19.4	8.8
Median Income	$ 8,734	$ 9,097	$5,722	$13,572	$14,272	$ 8,922

Note: In current dollars. Households as of March of the following year.

[a] For 1970, the number of households by race will not add to all races because the latter was adjusted to population controls based on the 1970 census. These controls are not available by race.

Source: Money Income in 1977 of Households in the United States. Current Population Reports Series P-60, No. 117, December 1978:7.

Figure 3—Percentage Distribution of U.S. Households by Income, 1970 and 1977



Source: Table 3

Morbidity and Mortality of the U.S. Population

Morbidity and mortality rates are frequently cited as indicators of the health status of the population. With economic and social improvements as well as advancements in medical technology, death rates have continued to decline and life expectancy for the general population has increased. Between 1930 and 1977 life expectancy has increased by approximately 11 years for males and 16 years for females. People who would have died of certain communicable diseases a number of years ago are living longer but are now susceptible to degenerative diseases. This fact is reflected in the increased morbidity rates for these diseases. Therefore, although life may be substantially prolonged, longevity often may be accompanied by severe disability. In addition, those persons suffering from chronic conditions are more susceptible to acute illnesses. These developments account for part of the increase in morbidity rates and also explain selected increased demand for medical care.

Highlights of selected health status indicators are:

- The average length of life for the U.S. population has increased 7.3 percent since 1950, from 68.2 years in 1950 to 73.2 years in 1977. In 1977, females had a life expectancy 7.8 years greater than males.
- In 1977, white males had an average length of life of 70.0 years, while males of all other races had an estimated average of 64.6 years. White females had an estimated average of 77.7 years, while females of all other races had an average length of life of 73.1 years.
- In 1978, the death rate for the U.S. population was 8.8 per 1,000 population.
- Heart disease was still the leading cause of death in 1978, accounting for 333.9 deaths per 100,000 population, representing 37.8 percent of all deaths.
- In 1977, the Middle Atlantic Census Division had the highest death rate due to heart disease (395.3 per 100,000 population) while the Mountain Census Division had the lowest (231.6 per 100,000 population).
- Data on days of disability per person in 1978 indicate that an average individual had 18.8 days of restricted activity, 7.1 days of bed disability, and 5.2 work-loss days per year.
- The number of restricted activity and bed disability days per person per year decreases as income increases, regardless of age.

Table 4—Median Family Income by Area of Residence and Race, 1977

Type of Residence	All Families		White Families		Black Families	
	Number (000)	Median Income	Number (000)	Median Income	Number (000)	Median Income
United States	57,215	$16,009	50,530	$16,740	5,806	$ 9,563
Metropolitan areas	37,841	17,371	32,824	18,211	4,358	10,431
1,000,000 or more	21,572	18,196	18,333	19,207	2,821	10,796
In central cities	7,993	14,677	5,694	16,255	2,069	10,012
Outside central cities	13,579	20,110	12,639	20,413	751	13,104
Under 1,000,000	16,269	16,329	14,491	17,025	1,537	9,910
In central cities	7,367	15,192	6,123	16,315	1,119	8,922
Outside central cities	8,902	17,252	8,368	17,503	418	12,858
Nonmetropolitan areas	19,374	13,789	17,706	14,403	1,448	7,512
Non-farm	17,584	13,982	16,020	14,590	1,367	7,653
Farm	1,790	11,754	1,686	12,272	82	5,393

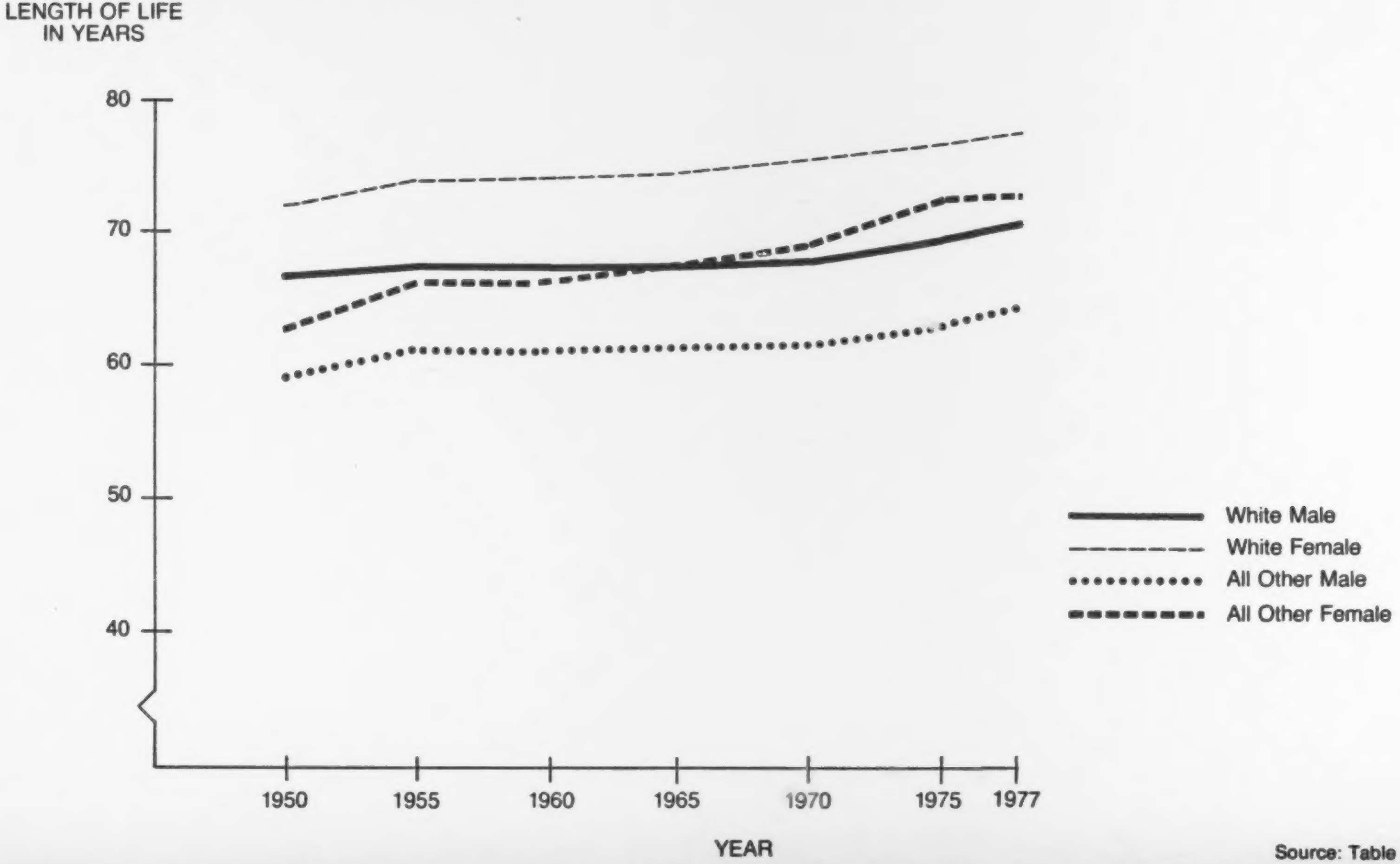
Source: Money Income in 1977 of Families and Persons in the United States. *Current Population Reports* Series P-60, No. 118, March 1979:51-53.

Table 5—Estimated Average Length of Life in Years, by Color and Sex, Selected Years 1950-1977

Year	Total			White			All Other		
	Both Sexes	Male	Female	Both Sexes	Male	Female	Both Sexes	Male	Female
1950	68.2	65.6	71.1	69.1	66.5	72.2	60.8	59.1	62.9
1955	69.6	66.7	72.8	70.5	67.4	73.7	63.7	61.4	66.1
1960	69.7	66.6	73.1	70.6	67.4	74.1	63.6	61.1	66.3
1965	70.2	66.8	73.8	71.1	67.6	74.8	64.3	61.2	67.6
1966	70.2	66.7	73.9	71.1	67.5	74.8	64.2	60.9	67.6
1967	70.5	67.0	74.3	71.4	67.8	75.2	64.9	61.4	68.5
1968	70.2	66.6	74.1	71.1	67.5	75.0	64.1	60.4	67.9
1969	70.5	66.8	74.4	71.4	67.7	75.3	64.5	60.6	68.6
1970	70.8	67.1	74.7	71.7	68.0	75.6	65.3	61.3	69.4
1971	71.1	67.4	75.0	71.9	68.2	75.8	65.6	61.6	69.7
1972	71.1	67.4	75.0	72.0	68.2	75.9	65.6	61.4	69.9
1973	71.3	67.5	75.2	72.1	68.4	76.1	65.9	61.8	70.1
1974	71.9	68.1	75.8	72.7	68.9	76.6	67.0	62.9	71.3
1975	72.5	68.7	76.5	73.2	69.4	77.2	67.9	63.6	72.3
1976	72.8	69.0	76.7	73.5	69.7	77.3	68.4	64.2	72.7
1977	73.2	69.3	77.1	73.8	70.0	77.7	68.8	64.6	73.1

Source: National Center for Health Statistics: Life Tables. *Vital Statistics of the United States, 1977*. Vol. 2 Hyattsville, M.D.: U.S. Department HEW, 1979:16

Figure 4—Estimated Average Length of Life in Years by Race and Sex, 1950-1977



Source: Table 5

Table 6—Average Expectation of Life in Years at Specified Ages, by Color and Sex, Selected Years 1939-1977

	Male					Female				
Race and Year	At Birth	Age 20	Age 40	Age 50	Age 65	At Birth	Age 20	Age 40	Age 50	Age 65
White										
1939-1941	62.8	47.8	30.0	22.0	12.1	67.3	51.4	33.3	24.7	13.6
1949-1951	66.3	49.5	31.2	22.8	12.8	72.0	54.6	35.6	26.8	15.0
1959-1961	67.6	50.3	31.7	23.2	13.0	74.2	56.3	37.1	28.1	15.9
1969-1971	67.9	50.2	31.9	23.3	13.0	75.5	57.2	38.1	29.1	16.9
1975	69.4	51.4	33.0	24.3	13.7	77.2	58.6	39.4	30.3	18.1
1976	69.7	51.6	33.1	24.4	13.7	77.3	58.7	39.5	30.4	18.1
1977	70.0	51.9	33.4	24.7	13.9	77.7	59.1	39.8	30.7	18.4
All other										
1939-1941	52.3	39.7	25.2	19.2	12.2	55.5	42.1	27.3	21.0	14.0
1949-1951	58.9	43.7	27.3	20.3	12.8	62.7	46.8	29.8	22.7	14.5
1959-1961	61.5	45.8	28.7	21.3	12.8	66.5	50.1	32.2	24.3	15.1
1969-1971	61.0	44.4	28.3	21.2	12.9	69.1	51.9	33.9	26.0	16.0
1975	63.6	46.3	29.8	22.4	13.7	72.3	54.7	36.2	27.9	17.5
1976	64.1	46.8	30.0	22.5	13.8	72.6	54.9	36.4	28.0	17.6
1977	64.6	47.2	30.2	22.7	14.0	73.1	55.2	36.7	28.3	17.8

Source: U.S. Bureau of the Census: Statistical Abstract of the United States, 1979. Government Printing Office, 1979:70.

Table 7—Estimated Death Rates by Age, Color, and Sex, 1978

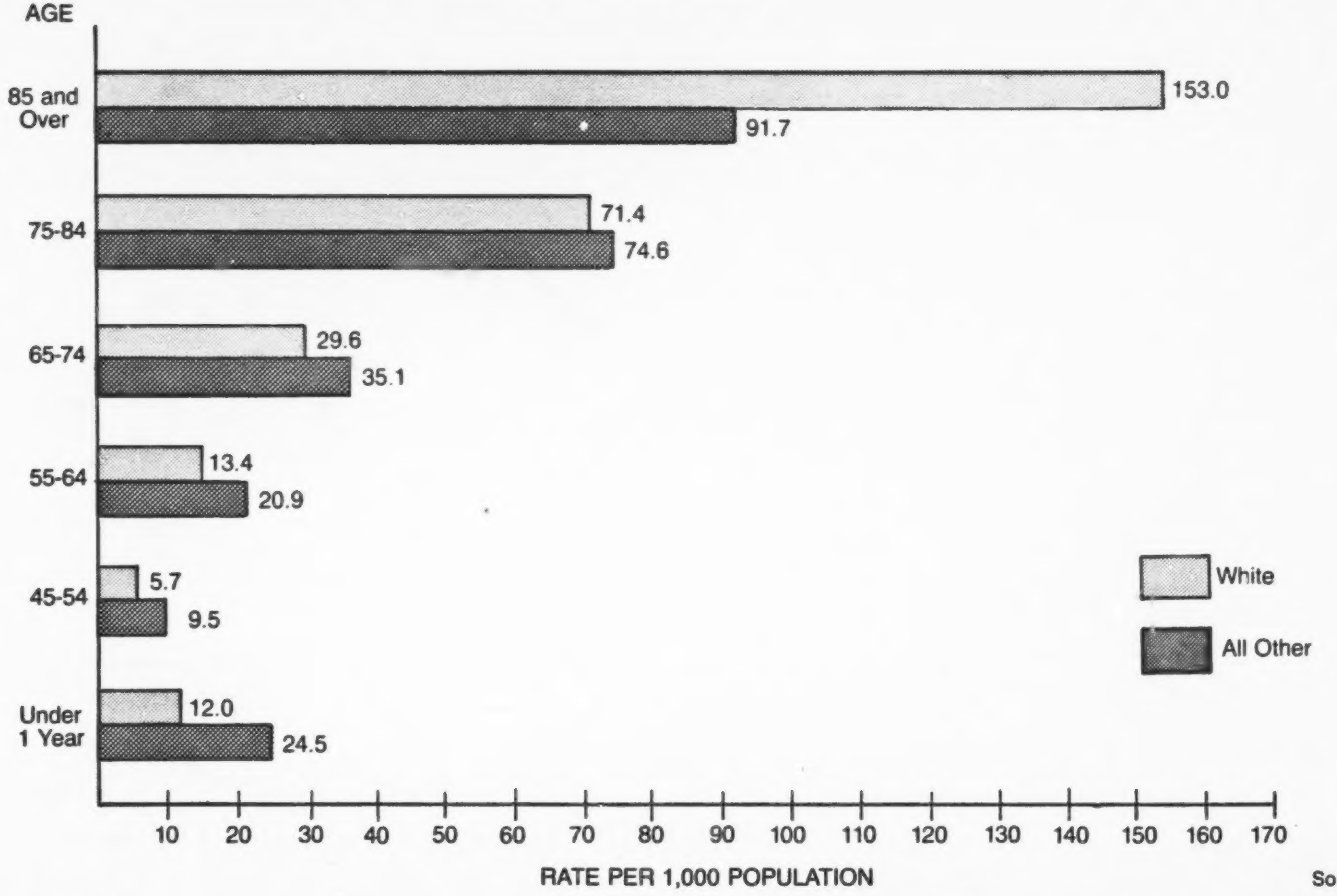
	Total			White			All Other		
Age (years)	Both Sexes	Male	Female	Both Sexes	Male	Female	Both Sexes	Male	Female
All ages[a]	8.8	9.9	7.8	9.0	10.0	8.0	7.9	9.4	6.6
Under 1	14.2	15.3	12.9	12.0	13.0	11.0	24.5	26.8	22.2
1 to 4	0.7	0.7	0.6	0.6	0.7	0.6	0.9	0.9	0.9
5 to 14	0.3	0.4	0.2	0.3	0.4	0.2	0.4	0.6	0.3
15 to 24	1.2	1.8	0.6	1.2	1.7	0.6	1.4	2.1	0.8
25 to 34	1.4	1.9	0.8	1.2	1.7	0.7	2.6	3.8	1.6
35 to 44	2.4	3.2	1.6	2.1	2.7	1.4	4.6	6.6	3.0
45 to 54	6.1	8.0	4.3	5.7	7.4	4.0	9.5	12.6	6.7
55 to 64	14.1	18.8	9.9	13.4	18.0	9.3	20.9	26.9	15.7
65 to 74	30.2	41.9	21.2	29.6	41.5	20.6	35.1	45.1	27.2
75 to 84	71.6	93.7	58.3	71.4	94.1	57.9	74.6	89.7	63.6
85 and over	146.8	170.8	135.9	153.0	179.6	141.1	91.7	101.0	86.1

Note: Based on a 10 percent sample of deaths. Rates per 1,000 population in specified group.

[a] Figures for age not stated included in "All ages" but not distributed among age groups.

Source: Annual Summary for the United States, 1978. Monthly Vital Statistics Report, 27:21-22, August 13, 1979.

Figure 5—Death Rates per 1,000 Population for Selected Age Groups by Color, 1978



Source: Table 7

Infant and Maternal Mortality in the United States

The U.S. infant mortality rate is regarded as a key indicator of the level of health of the population, and by implication, as a measure of the effectiveness of the nation's health care delivery system. The following data summarize the United States infant and maternal mortality experience:

- The 1978 estimated infant mortality rate for the U.S. was 13.6 per 1,000 live births. This represents a 53.4 percent decrease from 1950 when the rate was 29.2 per 1,000 live births. It also represents a 15.5 percent decrease from 1975 when the rate was 16.1 per 1,000 live births.
- The infant mortality rate for the white population in 1977 was substantially lower (12.3 per 1,000 live births) than for other races (21.7 per 1,000 live births).
- The East South Central and South Atlantic Census Divisions had the highest infant mortality rate in the country in 1978 (15.3 per 1,000 live births), while the New England and Pacific Divisions had the lowest (10.0 and 11.8 per 1,000 live births, respectively).
- In 1978 New Hampshire had the lowest infant mortality rate (8.3 per 1,000 live births), while the District of Columbia had the highest rate (23.1 per 1,000 live births).
- The maternal mortality rate decreased from 22.2 per 100,000 live births in 1969 to 12.8 per 100,000 live births in 1975.
- The maternal mortality rate for white females in 1975 was 9.1 per 100,000 live births, whereas the rate for females of all other races was 29.1 per 100,000 live births.

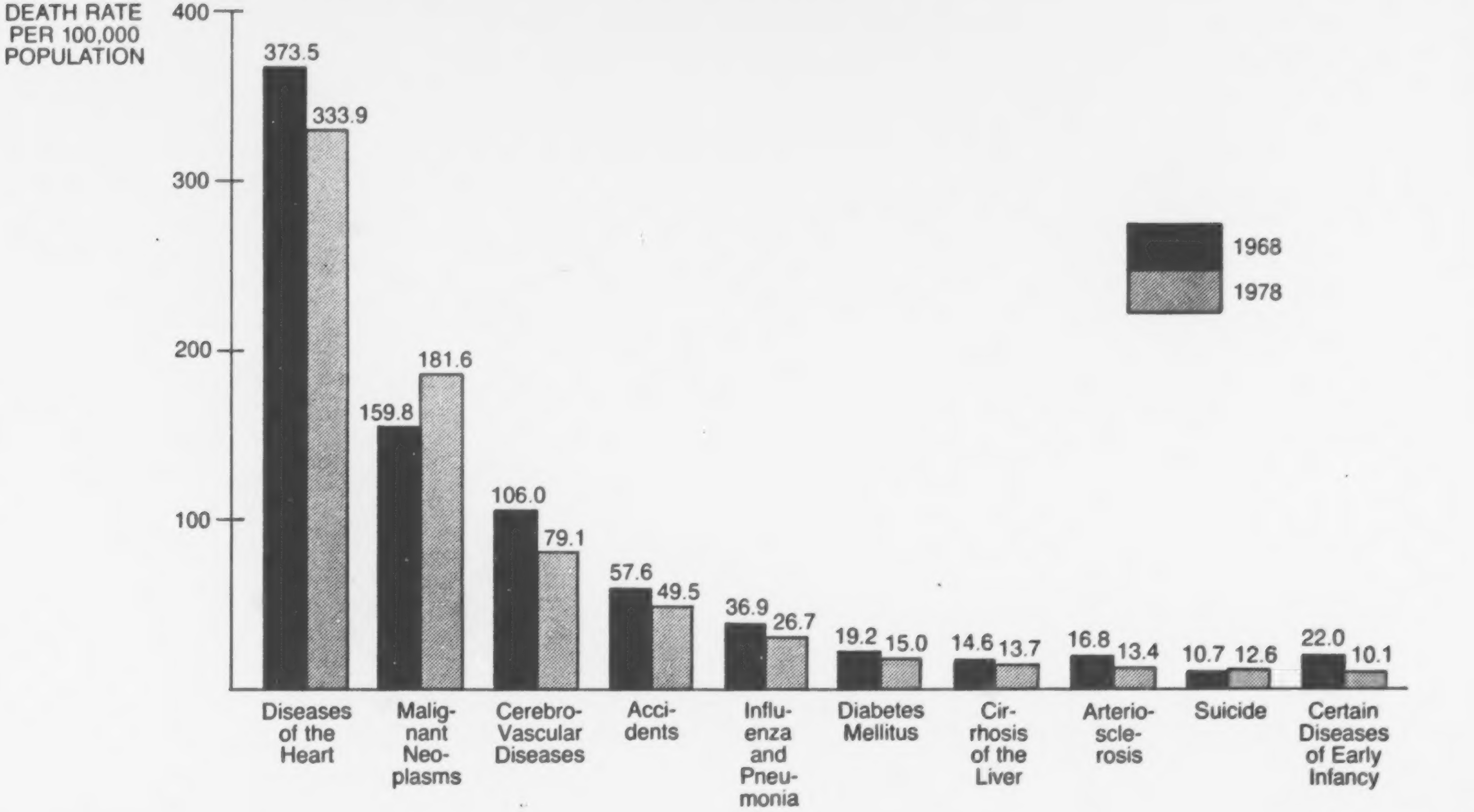
Table 8—Death Rates for the 15 Leading Causes of Death, 1968, 1977, and 1978

	1968			1977			1978		
Cause of Death	Rank	Death Rate	% Total of Deaths	Rank	Death Rate	% Total of Deaths	Rank	Death Rate	% Total of Deaths
All causes		967.9	100.0%		878.1	100.0%		882.3	100.0%
Diseases of heart	1	373.5	38.6	1	332.3	37.8	1	333.9	37.8
Malignant neoplasms	2	159.8	16.5	2	178.7	20.4	2	181.6	20.6
Cerebrovascular diseases	3	106.0	11.0	3	84.1	9.6	3	79.1	9.0
Accidents	4	57.6	6.0	4	47.7	5.4	4	49.5	5.6
Influenza and pneumonia	5	36.9	3.8	5	23.7	2.7	5	26.7	3.0
Diabetes mellitus	7	19.2	2.0	6	15.2	1.7	6	15.0	1.7
Cirrhosis of liver	10	14.6	1.5	7	14.3	1.6	7	13.7	1.6
Arteriosclerosis	8	16.8	1.7	8	13.3	1.5	8	13.4	1.5
Suicide	11	10.7	1.1	8	13.3	1.5	9	12.6	1.4
Certain causes of mortality in early infancy	6	22.0	2.3	10	10.8	1.2	10	10.1	1.1
Bronchitis, emphysema, and asthma	9	16.6	1.7	11	10.3	1.2	11	10.0	1.1
Homicide	13	7.4	0.8	12	9.2	1.0	12	9.7	1.1
Congenital anomalies	12	8.4	0.9	13	6.0	0.7	13	5.9	0.7
Nephritis and nephrosis	14	4.7	0.5	14	3.9	0.4	14	3.7	0.4
Septicemia	15	1.5	0.2	15	3.3	0.4	15	3.6	0.4
All other causes	--	112.3	11.6	--	111.9	12.7	--	113.8	12.9

Note: For 1978, based on a 10-percent sample of deaths; for all other years, based on final data. Rates per 100,000 population.

Source: Annual Summary for the United States, 1978. Monthly Vital Statistics Report, 26:24-25, August 13, 1979.

Figure 6—Estimated Death Rates per 100,000 Population for the 10 Leading Causes of Death, 1968 and 1978



Source: Table 8

Table 9—Death Rates for the 10 Leading Causes of Death by Census Division, 1977

Census Division	Heart Dis. a	Malig. Neop. b	Vasc. Dis. c	Acci- dents d	Pneum. & Flu e	Diabe- tes f	Cirrh. of Liv. g	Arteri- oscler. h	Sui- cide i	Dis. of Infan. j
United States	332.3	178.7	84.1	47.7	23.7	15.2	14.3	13.3	13.3	10.8
New England	347.0	199.5	78.3	36.2	26.7	16.0	15.3	14.4	10.5	7.6
Middle Atlantic	395.3	203.8	77.4	35.6	26.5	17.9	17.5	11.8	9.8	10.2
East No. Central	350.6	177.7	84.5	42.7	22.3	17.1	13.3	14.9	12.5	11.2
West No. Central	350.3	180.8	96.8	50.2	26.6	15.4	10.1	17.4	12.0	10.5
South Atlantic	331.7	180.8	89.1	51.9	23.7	15.3	15.0	12.0	14.6	12.0
East So. Central	332.7	173.1	106.8	62.4	25.1	15.8	9.3	12.7	12.3	13.0
West So. Central	294.4	160.9	88.4	56.2	22.7	14.2	10.6	13.5	13.6	13.4
Mountain	231.6	134.6	60.3	64.4	21.2	11.5	13.1	11.8	19.5	10.6
Pacific	273.3	167.1	75.6	49.5	19.9	10.5	18.0	12.2	17.1	8.3

a-Diseases of Heart
b-Malignant neoplasms
c-Cerebrovascular diseases
d-Accidents
e-Pneumonia, flu
f-Diabetes mellitus
g-Cirrhosis of liver
h-Arteriosclerosis
i-Suicide
j-Early infancy diseases

Source: U.S. Bureau of Census: Statistical Abstract of the United States, 1979. Government Printing Office, 1979:77.

Table 10—Days of Disability per Person per Year, by Sex and Age, 1975 and 1978

Sex and Age	Days of Disability Per Person Per Year					
	Restricted Activity		Bed Disability		Work Loss	
	1975	1978	1975	1978	1975	1978
Both sexes -- all ages	17.9	18.8	6.6	7.1	5.2	5.2
Under 17 years	11.0	11.3	4.4	5.2	a	a
17 to 24 years	12.3	12.3	5.1	5.5	4.6	4.5
25 to 44 years	15.6	16.2	5.8	5.8	5.1	5.1
45 to 64 years	24.2	25.8	8.4	8.8	5.8	6.1
65 years and over	38.4	40.3	12.9	14.5	4.3	4.2
Male -- all ages	15.6	16.3	5.4	6.0	4.9	4.9
Under 17 years	10.9	10.7	4.2	4.9	a	a
17 to 24 years	10.2	10.5	3.4	4.1	4.4	4.2
25 to 44 years	13.0	13.9	4.3	4.5	4.7	4.4
45 to 64 years	22.0	23.2	7.1	7.3	5.5	6.2
65 years and over	34.3	35.1	12.2	14.2	5.1	2.9
Female -- all ages	20.0	21.1	7.6	8.2	5.7	5.7
Under 17 years	11.1	11.8	4.6	5.6	a	a
17 to 24 years	14.3	14.0	6.7	6.8	4.8	4.9
25 to 44 years	18.1	18.3	7.2	7.1	5.9	6.0
45 to 64 years	26.2	28.1	9.6	10.1	6.2	5.9
65 years and over	41.4	43.9	13.4	14.8	--	6.5

[a] Work loss reported only for currently employed persons aged 17 and over.

Source: Current Estimates from the Health Interview Survey - United States - 1978, Vital and Health Statistics Series 10, No. 130, November 1979:22.

Table 11—Days of Restricted Activity and Bed Disability per Person per Year, by Age and Family Income, 1975

	Family Income						
Age	All Incomes[a]	Less than $3,000	$3,000-$4,999	$5,000-$6,999	$7,000-$9,999	$10,000-$14,999	$15,000-or more
	Days of restricted activity per person per year						
All Ages	17.9	36.9	28.6	23.6	17.6	14.4	12.4
Under 6 years	12.1	16.8	11.1	14.4	11.0	11.9	11.1
6 - 16 years	10.5	12.2	13.4	11.4	9.6	10.4	10.4
17 - 24 years	12.3	17.0	14.5	16.1	14.5	11.9	8.8
25 - 44 years	15.6	35.7	28.3	23.5	17.3	13.3	11.9
45 - 64 year	24.2	67.8	39.9	34.6	26.4	19.6	15.7
65 years and over	38.4	53.9	45.8	37.3	28.7	31.1	23.5
	Days of bed disability per person per year						
All Ages	6.6	13.4	9.9	8.6	6.6	5.3	4.6
Under 6 years	4.7	5.1	5.4	5.1	4.8	4.4	4.4
6 - 16 years	4.3	6.0	4.7	5.3	4.0	3.9	4.4
17 - 24 years	5.1	6.9	5.9	6.6	5.6	4.8	3.9
25 - 44 years	5.8	14.9	10.3	9.1	6.3	5.3	4.2
45 - 64 years	8.4	25.5	13.1	12.1	9.8	6.6	5.1
65 years and over	12.9	17.0	15.0	11.9	9.3	11.4	8.8

Note: No more recent data are available.

[a] Includes unknown income.

Source: Disability Days United States, 1975. Vital and Health Statistics Series 10, No. 118, June 1978:28, 29.

Table 12—Infant Mortality Rates by Age and Color, Selected Years 1950-1978

Year	Total			White			All Other		
	Under 1 Year	28 Day to 11 Months	Under 28 Days	Under 1 Year	28 Days to 11 Months	Under 28 Days	Under 1 Year	28 Days to 11 Months	Under 28 Days
1950	29.2	8.7	20.5	26.8	7.4	19.4	44.5	16.9	27.5
1960	26.0	7.3	18.7	22.9	5.7	17.2	43.2	16.4	26.9
1965	24.7	7.0	17.7	21.5	5.4	16.1	40.3	14.9	25.4
1967	22.4	5.9	16.5	19.7	4.7	15.0	35.9	12.1	23.8
1969	20.9	5.3	15.6	18.4	4.2	14.2	32.9	10.4	22.5
1970	20.0	4.9	15.1	17.8	4.0	13.8	30.9	9.5	21.4
1971	19.1	4.9	14.2	17.1	4.0	13.0	28.5	8.9	19.6
1972	18.5	4.8	13.6	16.4	4.0	12.4	27.7	8.5	19.2
1973	17.7	4.8	13.0	15.8	3.9	11.8	26.2	8.3	17.9
1974	16.7	4.4	12.3	14.8	3.7	11.1	24.9	7.7	17.2
1975	16.1	4.5	11.6	14.2	3.8	10.4	24.2	7.5	16.8
1976	15.2	4.3	10.9	13.3	3.6	9.7	23.5	7.2	16.3
1977	14.1	4.2	9.9	12.3	3.7	8.7	21.7	6.5	14.7
1978	13.6	4.2	9.4	NA	NA	NA	NA	NA	NA

Note: For 1978, based on a 10-percent sample of deaths; for 1972, based on a 50-percent sample of deaths; for all other years based on final data. Rates per 1,000 live births in specified group.

Source: Annual Summary for the United States. Monthly Vital Statistics Report 26:10, December 7, 1978; 27:9, August 13, 1979.

Characteristics of the Health Services Delivery System

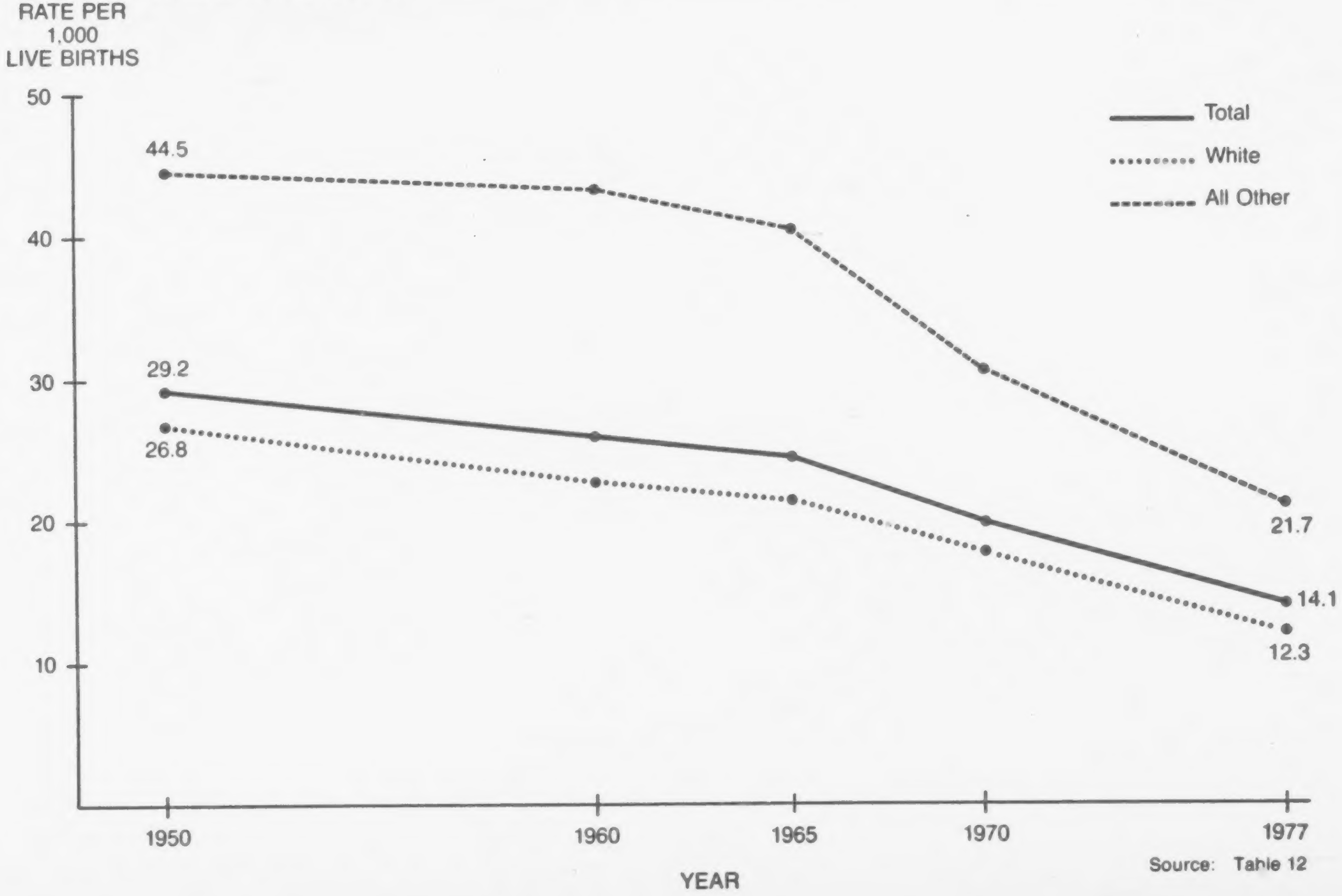
The supply of health services--both personnel and facilities--must be considered in any evaluation of health programs affecting the demand for and utilization of health services.

As demand has grown, the health care industry has expanded. It has now become the third largest employer in the U.S. economy. Despite such widespread expansion, however, few people would argue that the present distribution of health resources approximates an ideal situation.

Adequate description of the health care delivery system requires developing a statistical profile of all providers of care and the patterns of utilization of their services. The following represent the highlights of the characteristics of the health services delivery system:

- As of December 31, 1978, there were 437,486 physicians in the U.S. and its possessions; of these, 26,831 were inactive.
- In 1978, 78.3 percent of all physicians were in patient-care activities; of these, 70.0 percent were office-based.
- In 1978, there were 200 physicians per 100,000 population compared to 144 in 1960.
- Data indicate that in 1978 there were an estimated 1,577,000 registered and practical nurses in the U.S.
- In 1978, the total number of active civilian dentists was 115,450. Active pharmacists numbered 136,670 in 1978.
- According to 1976 estimates, approximately 5,100,000 persons were employed in the health care field.
- A total of 7,015 hospitals with 1,381,000 beds were serving the U.S. population in 1978. Over one-half (59.7 percent) of these hospitals were short-term general community hospitals with fewer than 200 beds.
- Total outpatient visits increased 45.3 percent between 1970 and 1978, from 181.4 million to 263.6 million.
- Adjusted expenses per inpatient day in community hospitals in 1978 were $193.81. This represents a 45.6 percent increase over 1975 and a 162.9 percent increase over 1970. When adjusted for general inflation, the increases were 20.1 percent from 1975 and 56.5 percent from 1970.
- The average number of physician visits per person per year was 4.8 in 1978 and 5.1 in 1975. Males made an average of 4.0 physician visits in 1978, and females made an average of 5.4 visits.

Figure 7—Infant Mortality Rates by Color, Selected Years 1950-1977



Source: Table 12

Table 13—Infant Mortality Rates by Region and State, 1970 and 1978

Region/State	Infant Mortality Rate		Region/State	Infant Mortality Rate		Region/State	Infant Mortality Rate	
	1970	1978		1970	1978		1970	1978
New England	16.8	10.0	Missouri	19.1	16.0	West So. Central	21.7	14.6
Maine	17.2	9.2	North Dakota	14.1	13.1	Arkansas	20.4	14.3
New Hampshire	17.8	8.3	South Dakota	19.8	12.0	Louisiana	25.1	17.8
Vermont	17.1	11.4	Nebraska	17.3	13.8	Oklahoma	20.3	13.8
Massachusetts	16.4	9.7	Kansas	17.6	11.5	Texas	21.1	13.8
Rhode Island	18.7	15.7	South Atlantic	22.0	15.3	Mountain	19.0	12.4
Connecticut	16.5	9.6	Delaware	19.4	12.0	Montana	21.7	10.0
Middle Atlantic	19.8	14.9	Maryland	19.4	14.4	Idaho	16.3	9.7
New York	19.8	16.3	Dist. of Col.	27.0	23.1	Wyoming	18.9	9.0
New Jersey	19.0	11.8	Virginia	20.6	13.3	Colorado	20.3	11.9
Pennsylvania	20.1	14.8	West Virginia	22.8	15.1	New Mexico	21.1	14.5
East No. Central	19.5	13.0	North Carolina	23.9	16.3	Arizona	18.2	15.0
Ohio	18.4	13.0	South Carolina	22.6	18.5	Utah	15.3	12.0
Indiana	19.2	12.2	Georgia	21.4	14.7	Nevada	23.5	11.3
Illinois	21.4	14.7	Florida	21.7	14.2	Pacific	17.4	11.8
Michigan	20.1	13.4	East So. Central	23.0	15.3	Washington	18.9	11.5
Wisconsin	16.4	9.2	Kentucky	19.8	12.0	Oregon	16.9	13.2
West No. Central	17.9	13.3	Tennessee	21.3	16.1	California	17.1	11.6
Minnesota	16.8	12.3	Alabama	24.3	16.4	Alaska	22.1	16.3
Iowa	18.5	11.8	Mississippi	28.2	17.1	Hawaii	18.9	11.8

Note: Rates are deaths under 1 year per 1,000 live births.

Source: Annual Summary for the United States. Monthly Vital Statistics Report 19:14, September 21, 1971; 27:18, August 13, 1979.

Table 14—Infant Mortality Rates by Selected Causes, Selected Years 1960-1978

Causes of Death	1960	1965	1970	1971	1972	1973	1974	1975	1976	1977	1978
Total, under 1 year	26.0	24.7	20.0	19.1	18.5	17.7	16.7	16.1	15.2	14.1	13.6
Certain gastrointestinal diseases	0.8	0.6	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2
Influenza and pneumonia	3.1	2.9	1.7	1.5	1.3	1.1	0.8	0.7	0.6	0.5	0.5
Congenital anomalies	3.6	3.6	3.0	3.0	2.9	2.9	2.7	2.7	2.6	2.5	2.5
Birth injuries	2.4	2.1	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5
Asphyxia of newborn, unspecified	4.6	4.1	2.5	2.3	2.1	1.7	1.5	1.3	1.1	1.0	0.9
Immaturity, unqualified	4.6	3.8	2.3	2.1	1.9	1.7	1.5	1.4	1.3	1.1	1.1
Other diseases of early infancy	3.3	3.9	6.1	5.8	5.8	5.6	5.5	5.2	4.9	4.4	4.1
All other causes	3.7	3.8	3.5	3.6	3.7	3.8	3.8	3.9	3.9	3.9	3.9

Note: For 1978, based on a 10 percent sample of deaths; for all other years based on final data. Rates per 1,000 live births.

Source: Annual Summary for the United States, Monthly Vital Statistics Report 17:5, August 15, 1969; 22:5, June 27, 1974; 23:5, May 30, 1975; 27:9, August 13, 1979.

Table 15—Maternal Mortality Rates by Age and Color, 1969, 1973, and 1975

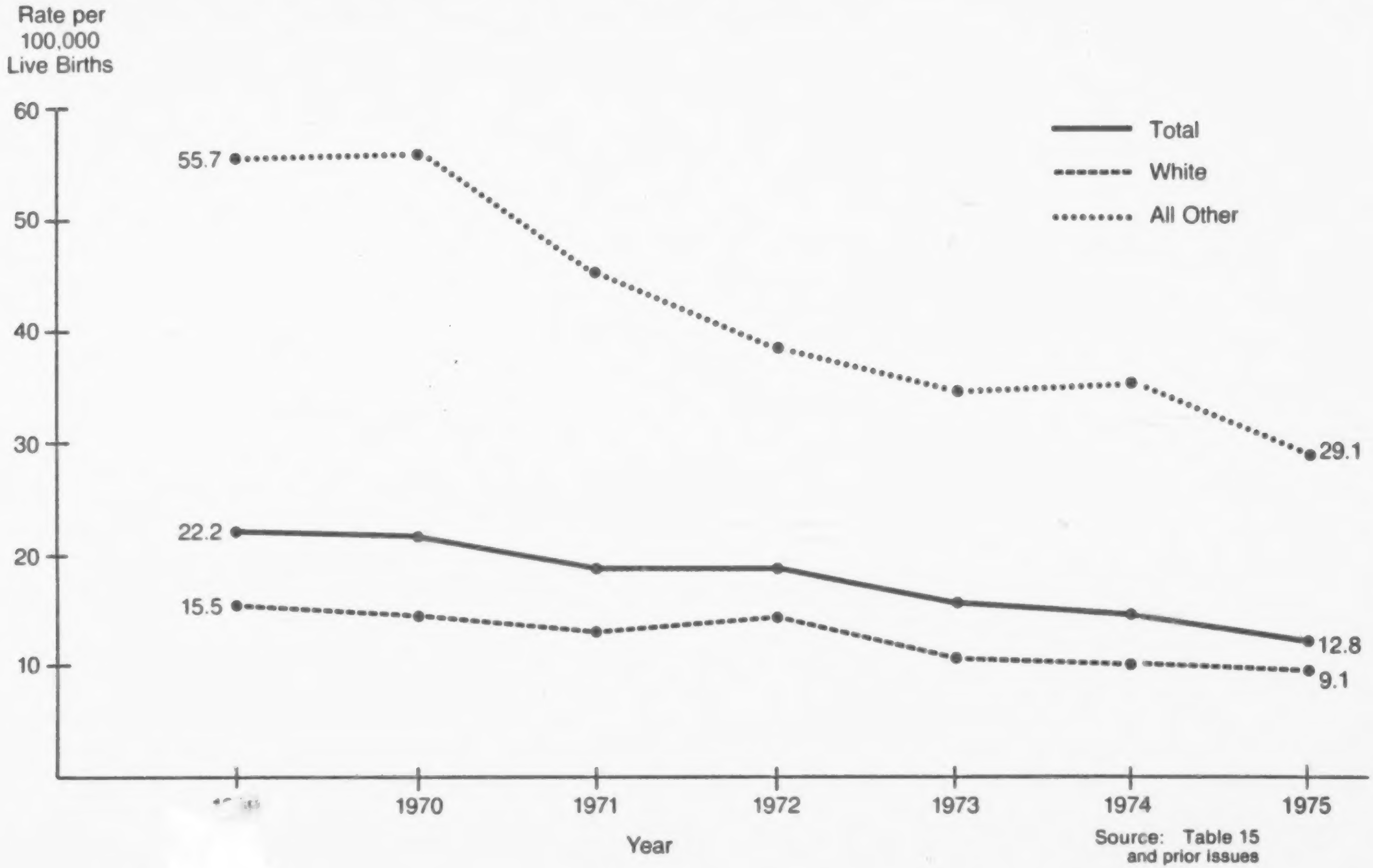
Age	1969			1973			1975		
	Total	White	All Other	Total	White	All Other	Total	White	All Other
Total	22.2	15.5	55.7	15.2	10.7	34.6	12.8	9.1	29.1
Under 20	17.7	10.0	36.7	12.6	6.5	26.7	9.9	7.9	14.5
20 - 24	13.1	9.9	31.3	9.3	7.3	18.2	8.7	5.8	21.6
25 - 29	17.0	13.0	45.9	13.1	10.6	29.8	11.3	8.3	30.5
30 - 34	34.9	23.3	100.1	26.2	17.5	74.2	18.1	10.1	62.8
35 - 39	69.6	47.8	173.9	44.2	27.2	117.5	45.9	36.5	85.8
40 - 44	119.3	78.7	298.7	78.5	55.3	167.6	76.0	58.4	138.9
45 and over[a]	176.5	73.2	600.6	154.5	66.9	447.4	129.9	80.8	255.8

Note: Maternal deaths are those assigned to complications of pregnancy, childbirth, and puerperium. Rates per 100,000 live births in specified group.

[a] Rates computed by relating deaths of women 45 years and over to live births to women 45-49 years.

Sources: National Center for Health Statistics: Vital Statistics of the United States, Vol. II, Part A 1969 Sect. 1:50; 1973 Sect. 1:72; 1975 Sect. 1:73. Government Printing Office 1974, 1977, 1979.

Figure 8—Maternal Mortality Rates by Color, 1969-1975



Source: Table 15
and prior issues

Table 16—Federal and Non-Federal Physicians by Activity, 1978

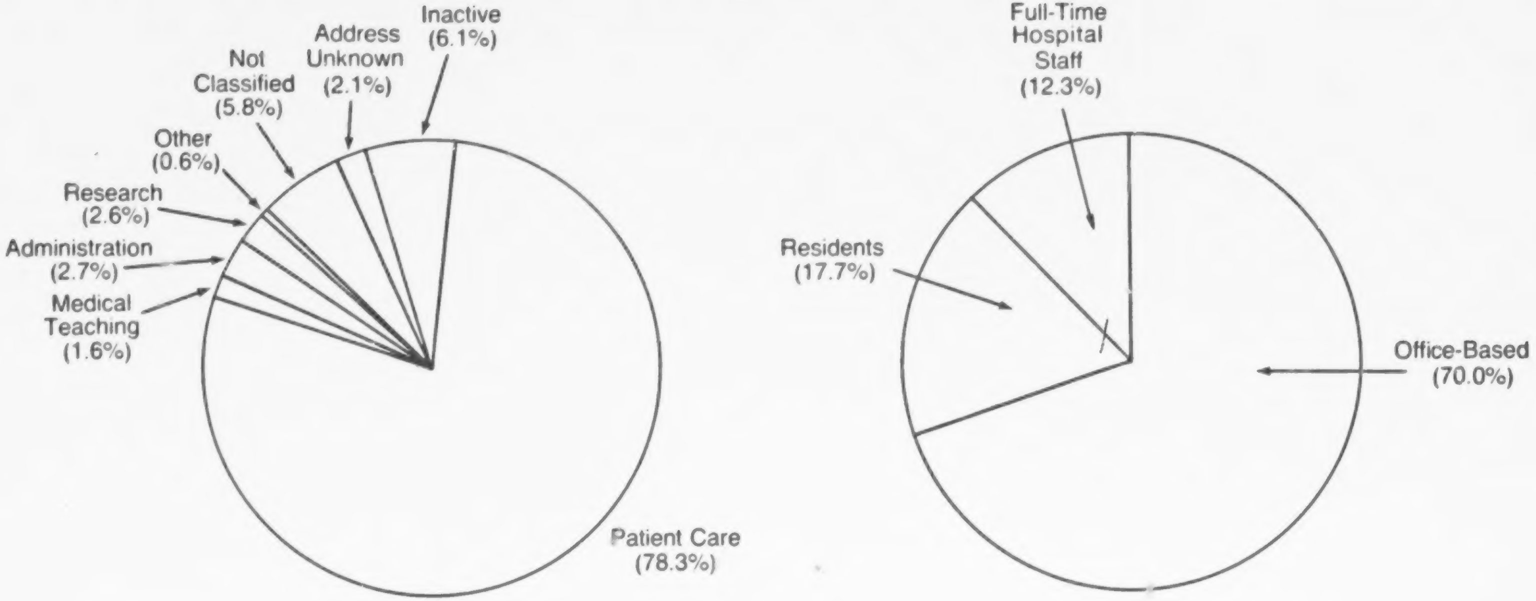
Activity	Total (100%)	Federal Number	Federal Percent	Nonfederal Number	Nonfederal Percent
Total Physicians	437,486[a]	20,242	4.6[b]	407,953	93.3[b]
Patient care	342,714	16,931	4.9	325,783	95.1
Office-based	239,866	923	0.4	238,943	99.6
Hospital-based	102,848	16,008	15.6	86,840	84.4
Residents--all years	60,610	3,405	5.6	57,205	94.4
Full-time staff	42,238	12,603	29.8	29,635	70.2
Other professional activity	33,097	3,311	10.0	29,786	90.0
Medical teaching	7,025	530	7.5	6,495	92.5
Administration	11,858	1,499	12.6	10,359	87.4
Research	11,437	1,071	9.4	10,366	90.6
Other	2,777	211	7.6	2,566	92.4
Not classified	25,553	--	--	25,553	100.0
Inactive	26,831	--	--	26,831	100.0

[a] Includes 9,291 physicians with unknown addresses who are not distributed throughout table.

[b] 2.1% for the unknown addresses should be added to the sum of 4.6% and 93.3% to get 100%.

Source: Wunderman, L. E.: Physician Distribution and Medical Licensure in the U.S., 1978. Chicago: American Medical Association, 1979:46, 48, 74.

Figure 9—Percentage Distribution of Total Physicians and Physicians in Patient Care by Activity, 1978



Total Physicians
(437,486)

Patient-Care Physicians
(342,714)

Source: Table 16

Table 17—Physicians, Population, and Physician/Population Ratios, Selected Years 1950-1978

Year	Total Physicians[a]	Total Population[b] (millions)	Physicians Per 100,000 Population	Population Per Physician	Nonfederal Physicians in Patient Care[c]	Civilian Population[b] (millions)	Nonfed. in Patient Care Per 100,000 Civ. Pop.	Civ. Pop. Per Nonfederal Physician in Pat. Care
1950	219,997	152.3	144	692	NA	150.8	NA	NA
1960	260,484	180.7	144	694	NA	178.1	NA	NA
1965	292,088	194.3	150	665	237,482	191.6	124	807
1970	334,028	204.9	163	613	252,778	201.7	125	798
1971	344,823	207.1	167	601	261,335	204.3	128	782
1972	356,534	208.8	171	586	266,587	206.5	129	775
1973	366,379	210.4	174	574	270,412	208.1	130	770
1974	379,748	211.9	179	558	276,070	209.7	132	760
1975	393,742	213.6	184	542	285,345	211.4	135	741
1976	409,446	215.2	190	526	292,152	213.0	137	729
1977	421,278	216.9	194	515	312,872	214.7	146	686
1978	437,486	218.5	200	499	322,835	216.4	149	670

[a] Includes inactive, not classified, and physicians whose address is unknown as of December 31. [b] Total population includes Armed Forces and their dependents in the U. S. and abroad. Civilian population excludes this group and those in U. S. Possessions. As of July 1. [c] Excludes physicians in U. S. Possessions (Canal Zone, Pacific Islands, Puerto Rico, and Virgin Islands) as of December 31.

Sources: U. S. Dept. Comm.: Statistical Abstract of the U. S., 1979, Government Printing Office, 1979:6.

U. S. Dept. HEW: Health Manpower Source Book Section 20 PHS Pub. No. 263, Government Printing Office, 1969:34.

Physician Distribution and Medical Licensure in the U. S., Chicago: American Medical Association, Annual Volumes, 1965-1979.

Table 18—Registered Nurses and Practical Nurses in Relation to Population, Selected Years 1960-1978

Year	Resident Population[a] (000s)	Registered Nurses		Practical Nurses	
		Number[b] (000s)	Per 100,000 Population	Number[b] (000s)	Per 100,000 Population
1960	178,729	504	282	206	115
1962	184,598	550	298	225	122
1964	190,169	582	306	250	131
1966	194,899	621	319	282	145
1968	199,017	667	335	320	161
1970	202,617	722	356	370	182
1971	205,056	750	366	400	195
1972	207,364	780	376	401	193
1973	209,118	815	390	423	202
1974	210,674	857	407	447	212
1975	212,318	906	427	468	220
1976	214,047	961	449	489	228
1978	217,391	1,059	487	518	238

Note: All numbers as of January 1.

[a] For 1975, 1976, and 1978, preliminary estimates.

[b] Estimates.

Sources: U. S. Dept. HEW: Health Resources Statistics, 1976-77. Government Printing Office, 1978: 168, 177.

U. S. Dept. HEW: Health Resources Statistics, 1978-79. Government Printing Office, forthcoming.

Table 19—Dentists in Relation to Population, Selected Years 1950-1978

Dentists and Population	1950	1960	1970	1976	1978
Total dentists	89,440	102,940	116,280	130,000	135,500
Total population (000s)[a]	153,620	182,290	206,070	215,869	219,484
Dentists per 100,000 population	58.2	56.5	56.4	60.2	61.7
Active dentists	76,940	90,040	102,220	115,000	120,620
Active civilian dentists	75,310	84,500	95,680	110,000	115,450
Resident civilian population (000s)[b]	151,240	179,740	203,110	213,860	217,389
Active civilian dentists per 100,000 civilians	49.8	47.0	47.1	51.4	53.1

Note: For 1978, data as of January 1. All other data as of December 31.

[a] Includes all persons in the United States and in the armed forces abroad.

[b] Excludes armed forces in the United States and abroad.

Sources: U. S. Dept. HEW: Health Resources Statistics, 1976-77 Government Printing Office, 1978:69.

U. S. Dept. HEW: Health Resources Statistics, 1978-79 Government Printing Office, forthcoming.

Table 20—Pharmacists in Relation to Population, Selected Years 1950-1978

Year	Civilian Population (thousands)	Active Pharmacists	Active Pharmacists Per 100,000 Population
1950[a]	150,697	89,200	59.2
1960	179,323	96,200	53.6
1970	203,212	110,400	54.3
1975[b]	213,953	121,500	56.9
1978[c]	217,446	136,670	62.8

[a] Excludes data for Alaska and Hawaii.

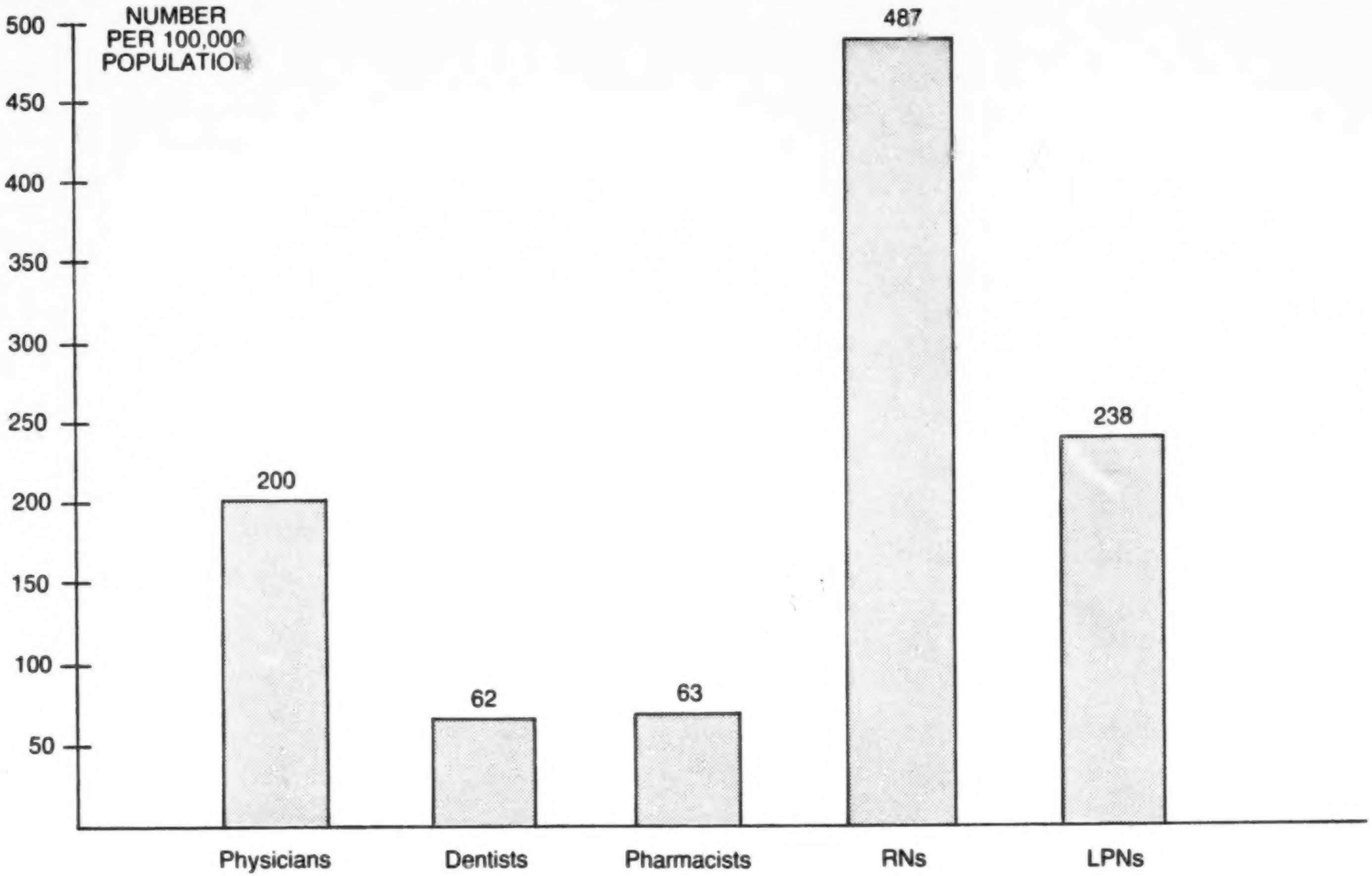
[b] Excludes Puerto Rico and United States possessions. December 31 estimate.

[c] January 1 estimate.

Sources: U.S. Dept. HEW: Health Resources Statistics, 1976-77. Government Printing Office, 1978: 204.

U.S. Dept. HEW: Health Resources Statistics, 1978-79. Government Printing Office, forthcoming.

Figure 10—Physicians, Dentists, Pharmacists, and Nurses per 100,000 Population, 1978



Source: Tables 17, 18, 19, and 20

Table 21—Estimated Number of Persons Employed in Selected Occupations Within the Health Care Field, 1976

Health Field	Number	Health Field	Number
Total[a]	5,080,500 to 5,118,400	Midwifery	4,350
Administration of health	48,200	Nursing & related services	2,489,600
Anthropology & sociology	1,900	Occupational therapy	17,000 to 18,000
Automatic data processing	4,300 to 5,400	Opticianry	12,000
Basic sciences[b]	65,000	Optometry	25,200 to 25,400
Biomedical engineering	13,000	Orthotic/prosthetic techn.	2,800 to 3,800
Chiropractic	18,200	Pharmacy	121,500
Clinical Laboratory Serv.	216,850	Physical therapy	32,100
Dentistry & allied serv.	321,600	Physician extender services	5,000
Dietetic & nutritional serv.	77,000	Podiatric medicine	7,100
Economic research	500	Psychology	71,000
Environmental sanitation	23,000 to 25,000	Radiologic technology	100,000
Food & drug services	51,100	Respiratory therapy	25,000
Funeral directors & embalmers	50,000	Secretarial/office services	275,000 to 300,000
Health & vital statistics	1,350	Social work	47,300
Health education	23,000	Special rehab. services	13,700
Health info. & commun.	8,400 to 10,500	Speech pathology/audiology	30,000
Library services	10,300	Veterinary medicine	36,000
Medical records	65,000	Vocational rehabilitation	18,000
Medicine (M.D. & D.O.)	393,700	Miscellaneous health services	355,450 to 360,950

[a] Each occupation is counted only once. For example, all physicians are in medicine and osteopathy.

[b] Statistics are not available on what percentage of the estimated 215,000 physician scientists are employed in the health field.

Source: U.S. Dept. HEW: Health Resources Statistics, 1976-77. Government Printing Office, 1978: 10-12.

Table 22—Hospitals, Beds, Admissions, Average Daily Census, and Occupancy Rate by Type of Hospital, 1970 and 1978

Type of Hospital	Hospitals		Beds (thousands)		Admissions (thousands)		Average Daily Census (thousands)		Occupancy (Percent)	
	1970	1978	1970	1978	1970	1978	1970	1978	1970	1978
Total U.S.	7,123	7,015	1,616	1,381	31,759	37,243	1,298	1,042	80.3	75.5
Federal	408	370	161	122	1,741	1,997	128	96	79.6	78.4
Nonfederal	6,715	6,645	1,455	1,259	30,018	35,246	1,170	946	80.4	75.2
Psychiatric	519	526	527	235	598	580	447	190	84.8	80.9
Tuberculosis	101	15	20	3	36	11	12	2	61.8	59.9
Long-term general	236	169	60	41	132	80	49	35	82.0	84.0
Short-term general[a]	5,859	5,935	848	980	29,252	34,575	662	720	78.0	73.5
Community hospitals	NA	5,851	NA	975	NA	34,506	NA	718	NA	73.6
6-24 beds	397	268	7	5	241	162	4	2	55.7	46.9
25-49	1,327	1,075	48	39	1,655	1,290	30	21	63.6	53.0
50-99	1,490	1,444	105	103	3,669	3,545	74	65	70.7	63.0
100-199	1,275	1,398	177	197	6,414	7,047	134	136	75.8	69.2
200-299	592	717	141	174	5,148	6,501	114	132	80.3	75.8
300-399	356	392	121	133	4,348	4,904	99	104	82.3	78.0
400-499	190	240	83	106	2,915	3,925	70	85	84.3	79.5
500 or more	232	317	166	218	4,862	7,132	136	174	81.8	79.8

Note: Figures may not add due to rounding. [a]For 1978, includes data not classified by number of beds for institutions other than community hospitals.

Sources: Hospitals Guide Issue 45:485, August 1 (pt. 2), 1971.

Hospital Statistics. Chicago: American Hospital Association, 1979:20.

Table 23—Total Outpatient Visits in 1970 and 1978 and Type of Outpatient Visits in 1978

Type of Hospital	Total Outpatient Visits		% Change 1970-1978	1978 Outpatient Visits by Type of Visits	
	1970	1978		Emergency	Clinic and Other
Total U.S.	181,370,461	263,606,079	+ 45.3%	82,871,521	180,734,558
Federal	42,912,742	50,352,648	+ 17.3	6,162,885	44,189,763
Nonfederal	138,457,719	213,253,431	+ 54.0	76,708,636	136,544,795
Psychiatric	2,739,743	5,602,495	+104.5	198,693	5,403,802
Tuberculosis	784,166	104,162	- 86.7	0	104,162
Long-term general	1,389,138	1,085,356	- 21.9	85,988	999,368
Short-term general[a]	133,544,672	206,461,418	+ 54.6	76,423,955	130,037,463
Community	NA	201,930,569	NA	76,122,758	125,807,811
6-24 beds	988,677	1,047,361	+ 5.9	273,561	773,800
25-49	6,328,810	6,436,790	+ 1.7	2,464,907	3,971,883
50-99	10,756,382	16,875,236	+ 56.9	7,568,121	9,307,115
100-199	23,489,914	38,271,106	+ 62.9	15,825,712	22,445,394
200-299	23,901,985	35,148,518	+ 47.1	15,064,337	20,084,181
300-399	20,392,848	30,748,280	+ 50.8	11,577,352	19,170,928
400-499	14,600,633	22,964,675	+ 57.3	8,021,238	14,943,437
500 and over	33,085,423	50,438,603	+ 52.4	15,327,530	35,111,073

[a] For 1978, includes data not classified by number of beds for institutions other than community hospitals.

Sources: Hospitals Guide Issue 45:485, August 1 (pt. 2), 1971.

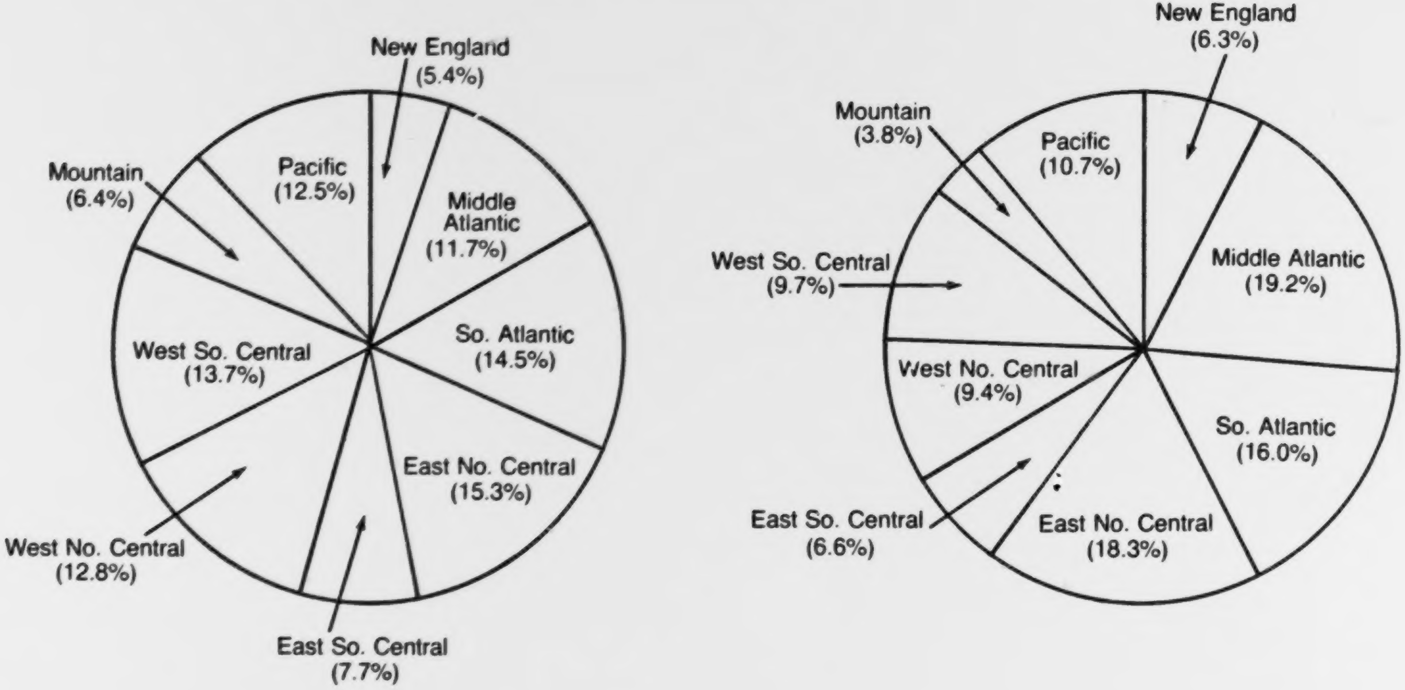
Hospital Statistics. Chicago: American Hospital Association, 1979:20.

Table 24—Hospitals, Beds, Admissions, Average Daily Census, and Occupancy Rate by Census Division, 1978

Census Divisions	Hospitals	Beds	Admissions	Average Daily Census	Occupancy Rate
United States -- Total	7,015	1,380,645	37,243,182	1,041,936	75.5
New England	379	86,302	1,934,885	67,432	78.1
Middle Atlantic	820	265,056	5,808,826	218,697	82.5
South Atlantic	1,014	220,670	5,998,761	167,118	75.7
East North Central	1,076	252,749	7,029,924	194,172	76.8
East South Central	543	91,299	2,803,857	69,590	76.2
West North Central	898	129,442	3,329,844	92,332	71.3
West South Central	961	134,331	4,181,134	94,033	70.0
Mountain	446	52,744	1,698,658	36,416	69.0
Pacific	878	148,052	4,457,293	102,146	69.0

Source: Hospital Statistics. Chicago: American Hospital Association, 1978:22-39.

Figure 11—Percentage Distribution of Hospitals and Hospital Beds by Census Division, 1978



HOSPITALS

HOSPITAL BEDS

Source: Table 24

Table 25—Selected Utilization Measures in all U.S. Hospitals and in Community Hospitals, 1968, 1977, and 1978

	All U.S. Hospitals					Community Hospitals				
				Percent Change					Percent Change	
Measure	1968	1977	1978	1968-78	1977-78	1968	1977	1978	1968-78	1977-78
Hospitals	7,137	7,099	7,015	- 1.7	-1.2	5,820	5,881	5,851	0.5	-0.5
Beds (000s)	1,663	1,407	1,381	-17.0	-1.8	806	969	975	21.0	0.6
Average number of beds per hospital	233	198	197	-15.5	-0.5	138	165	167	21.0	1.2
Admissions (000s)	29,766	37,060	37,243	25.1	0.5	27,276	34,273	34,506	26.5	0.7
Average daily census (000s)	1,378	1,066	1,042	-24.4	-2.3	630	715	718	14.0	0.4
Average length of stay, days	NA	NA	NA	--	--	8.4	7.6	7.6	-9.5	0.0
Occupancy, percent	82.9	75.8	75.5	-8.9	-0.4	78.2	73.8	73.6	-5.9	-0.3
Outpatient visits	156,139[a]	263,775	263,606	68.8	-0.1	114,097[a]	198,708	201,931	77.0	1.6

NA - Comparable data not available.

[a] Based only on hospitals reporting outpatient visits.

Source: Hospital Statistics. Chicago: American Hospital Association, 1979: v, vii.

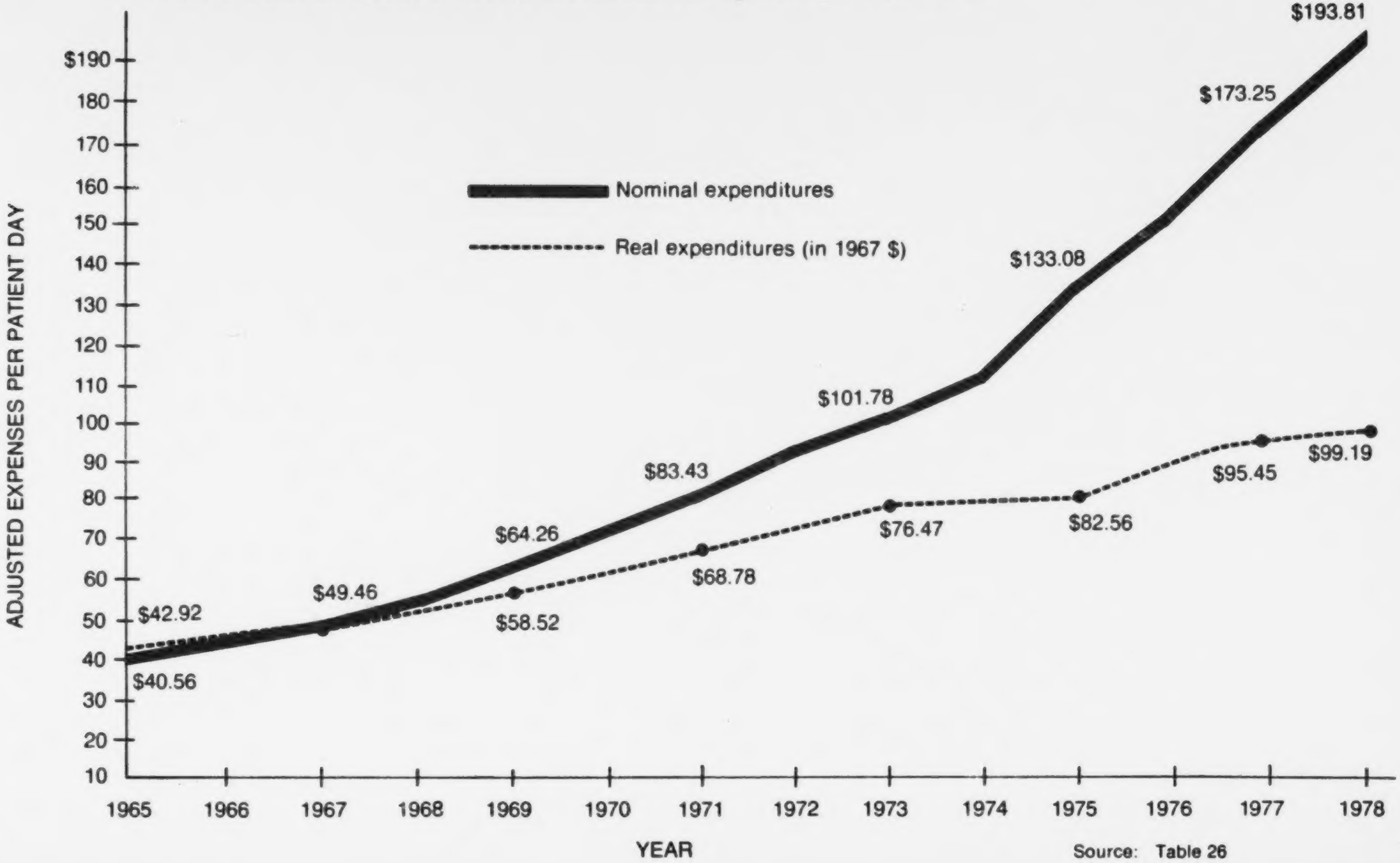
Table 26—Total Expenses and Expenses per Patient Day for Non-Federal Short-Term General Hospitals, Selected Years 1950-1978

Year	Total Expenses (in millions)	Annualized Percentage Increase	Expenses Per Inpatient Day	Annualized Percentage Increase	Adjusted Expenses Per Inpatient Day[a]	Annualized Percentage Increase	Real Adjusted Expenses Per Inpatient Day[b]
1950	$ 2,120	--	$ 15.62	--	NA	--	--
1955	3,434	10.1%	23.12	8.2%	NA	--	--
1960	5,617	10.3	32.23	6.9	NA	--	--
1965	9,147	10.2	44.48	6.7	$ 40.56	--	$42.92
1967	12,081	14.9	54.08	10.3	49.46	10.4	49.46
1969	16,613	17.3	70.03	13.8	64.26	14.0	58.52
1970	19,560	17.7	81.01	15.7	73.73	14.7	63.40
1971	22,400	14.5	92.31	13.9	83.43	13.2	68.78
1972	25,549	14.1	105.21	14.0	94.61	13.4	75.51
1973	28,496	11.5	114.69	9.0	101.78	7.6	76.47
1974	32,751	14.9	128.05	11.6	113.21	11.2	76.65
1975	39,110	19.4	151.42	18.3	133.08	17.6	82.56
1976	45,402	16.1	NA	NA	152.24	14.4	89.29
1977	51,832	14.2	NA	NA	173.25	13.8	95.45
1978	58,348	12.6	NA	NA	193.81	11.9	99.19

[a] Costs incurred are adjusted to eliminate that portion expended for outpatient care. The 1976, 1977, and 1978 data include adjusted expenses only. [b] Adjusted expenses per inpatient day are deflated by the annual consumer price index (all items).

Source: Hospital Statistics. Chicago: American Hospital Association, 1979:5.

Figure 12—Adjusted Expenses per Patient Day for Non-Federal Short-Term General Hospitals, 1965-1978



Source: Table 26

National Health Care Expenditures

Recent economic experience has generated increasing concern about the trend in health care prices and in expenditures for health care services. These trends can be attributed to such factors as increased demand for health care, expanded health services, and general inflationary pressures. The following summarize this trend over the past several years.

- Health care expenditures in the U.S. reached an estimated $192.4 billion, or $863 per capita, in 1978. This amount represented 9.1 percent of the Gross National Product, compared to 6.8 percent ten years earlier.
- In 1978, hospital care expenditures of $76.0 billion, or $341 per capita, accounted for the largest component of total health care outlays (39.5 percent).
- Expenditures for physicians' services amounted to $35.3 billion, or $158 per capita, in 1978. This amount represented the second largest component of total health expenditures (18.3 percent).
- In the nine-year period 1970-1978, per capita personal health care expenditures increased 139 percent, from $315 to $753.
- Per capita personal health expenditures for persons 65 years of age and older were $1,745 in fiscal 1977. This amount was almost three times greater than the per capita expenditures for all age groups ($646).
- In fiscal year 1978, $394.5 billion were spent for public social welfare programs, an increase of 170 percent since 1970.
- The "all items" component of the CPI increased 11.3 percent between 1978 and 1979, compared to 7.7 percent the previous year. The medical care component of the CPI rose 9.3 percent, compared to 8.4 percent the previous year.
- The charge for physicians' services increased 9.2 percent between 1978 and 1979, compared to 8.3 percent the previous year. The charge for a semi-private hospital room rose 11.4 percent, compared to 11.0 percent the previous year.

Table 27—Utilization Trends in Community Hospitals, Selected Years 1950-1978

	Hospital Beds		Average Daily Census		Admissions During Year	
	Number (000)	Per 1,000 Population	Number (000)	Per 1,000 Population	Number (000)	Per 1,000 Population
1950	505	3.3	372	2.5	16,663	110.5
1955	568	3.5	407	2.5	19,100	117.2
1960	639	3.6	477	2.7	22,970	129.0
1965	741	3.9	563	2.9	26,463	138.1
1966	768	4.0	588	3.0	26,897	139.1
1967	788	4.0	612	3.1	26,988	138.2
1968	806	4.1	630	3.2	27,276	138.4
1969	826	4.1	651	3.3	28,254	141.9
1970	848	4.2	662	3.3	29,252	145.0
1971	867	4.2	665	3.3	30,142	147.5
1972	879	4.3	663	3.2	30,709	148.7
1973	898	4.3	680	3.3	31,671	152.2
1974	926	4.4	700	3.3	32,866	156.7
1975	942	4.5	706	3.3	33,435	158.2
1976	956	4.5	713	3.3	33,979	159.5
1977	969	4.5	715	3.3	34,273	159.6
1978	975	4.5	718	3.3	34,506	159.5

Note: Before 1972, hospital data include information for hospital units of institutions. Population data refer to the civilian resident population.

Source: Hospital Statistics. Chicago: American Hospital Association, 1979:5,7.

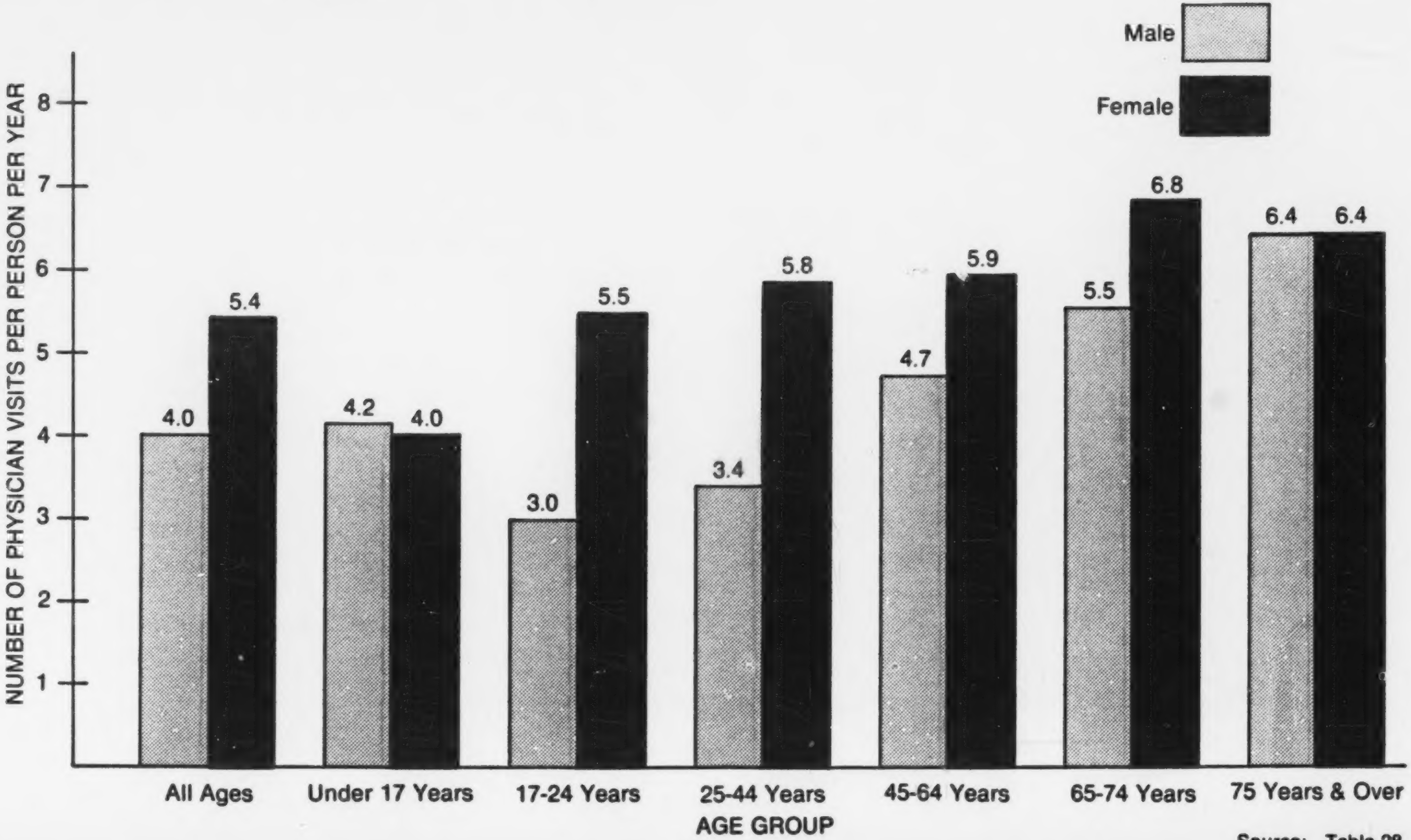
Table 28—Number of Physician Visits and Physician Visits per Person per Year, by Age and Sex, 1975 and 1978

	Physician Visits (thousands)						Visits Per Person Per Year					
	Both Sexes		Male		Female		Both Sexes		Male		Female	
Age (years)	1975	1978	1975	1978	1975	1978	1975	1978	1975	1978	1975	1978
All ages	1,056,094	1,016,647	435,256	417,278	620,838	599,370	5.1	4.8	4.3	4.0	5.7	5.4
Under 17	263,196	242,441	141,261	125,626	121,935	116,816	4.2	4.1	4.5	4.2	4.0	4.0
17-24	144,583	134,897	50,350	45,866	94,233	89,030	4.8	4.3	3.4	3.0	6.0	5.5
25-44	265,038	266,438	90,630	94,604	174,408	171,834	5.1	4.7	3.6	3.4	6.4	5.8
45-64	242,618	229,439	97,096	96,538	145,521	132,901	5.6	5.3	4.7	4.7	6.5	5.9
65-74	89,171	91,203	37,038	35,057	52,133	56,145	6.6	6.2	6.3	5.5	6.8	6.8
75 and over	51,487	52,230	18,880	19,587	32,607	32,643	6.6	6.4	6.5	6.4	6.7	6.4

Note: Data are based on household interviews of the civilian noninstitutionalized population.

Source: Current Estimates from the Health Interview Survey - United States 1976, 1978. Vital and Health Statistics Series 10, No. 115, March 1977:29; No. 130, November 1979:30.

Figure 13—Number of Physician Visits per Person per Year, by Age and Sex, 1978



Source: Table 28

Table 29—Number of Nursing Homes and Nursing Home Beds, 1963, 1973, and 1976

Type of Nursing Care and Related Homes	Nursing Homes			Nursing Home Beds		
	1963	1973	1976	1963	1973	1976
Total Homes	16,701	21,834	20,185	568,560	1,327,704	1,406,778
Nursing care	8,128	14,873	13,312	319,224	1,107,358	1,173,519
Personal care homes with nursing	4,958			188,306		
Personal care homes without nursing	2,927	6,961[a]	6,873[a]	48,962	220,346[a]	233,359[a]
Domiciliary care	688			12,068		

[a] Includes personal care homes with nursing, personal care homes without nursing and domicilary care homes.

Sources: U.S. Dept. HEW: Health Resources Statistics, 1975. Government Printing Office, 1976:365.

U.S. Dept. HEW: Health Resources Statistics, 1976-77. Government Printing Office, 1978:329.

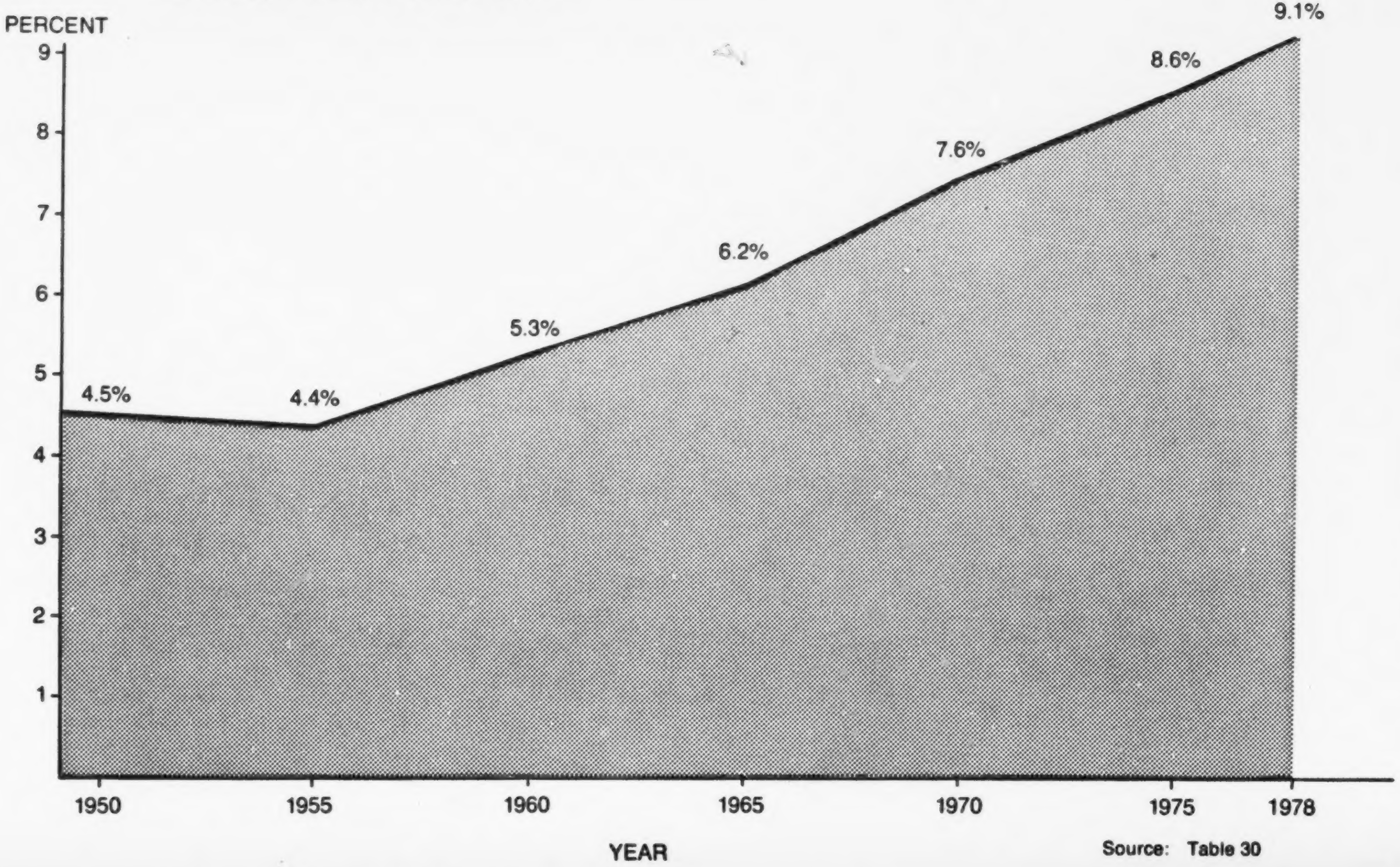
Table 30—Aggregate and Per Capita National Health Expenditures, by Percent of Gross National Product, Selected Years 1929-1978

Fiscal Year	Gross National Product (billions)	Health Expenditures (billions)	Percent of GNP	Per Capita
1929	$ 103.1	$ 3.6	3.5%	$ 29.49
1935	72.2	2.9	4.0	22.65
1940	99.7	4.0	4.0	29.62
1950	284.8	12.7	4.5	81.86
1955	398.0	17.7	4.4	105.38
1960	503.7	26.9	5.3	146.30
1965	688.1	43.0	6.2	217.42
1966	753.0	47.3	6.3	236.51
1967	796.3	52.7	6.6	260.35
1968	868.5	58.9	6.8	288.17
1969	935.5	66.2	7.1	320.70
1970	982.4	74.7	7.6	358.63
1971	1,063.4	82.8	7.8	393.09
1972	1,171.1	92.7	7.9	436.47
1973	1,306.6	102.3	7.8	478.38
1974	1,412.9	115.6	8.2	535.99
1975	1,528.8	131.5	8.6	604.57
1976	1,700.1	148.9	8.8	678.79
1977[a]	1,887.2	170.0	9.0	768.77
1978[b]	2,107.5	192.4	9.1	863.01

[a] Revised estimates. [b] Preliminary estimates.

Source: Gibson, R. M.: National Health Expenditures, 1978. Health Care Financing Review 1:1-36, Summer 1979.

Figure 14—National Health Expenditures as a Percentage of Gross National Product, Selected Years 1950-1978



Source: Table 30

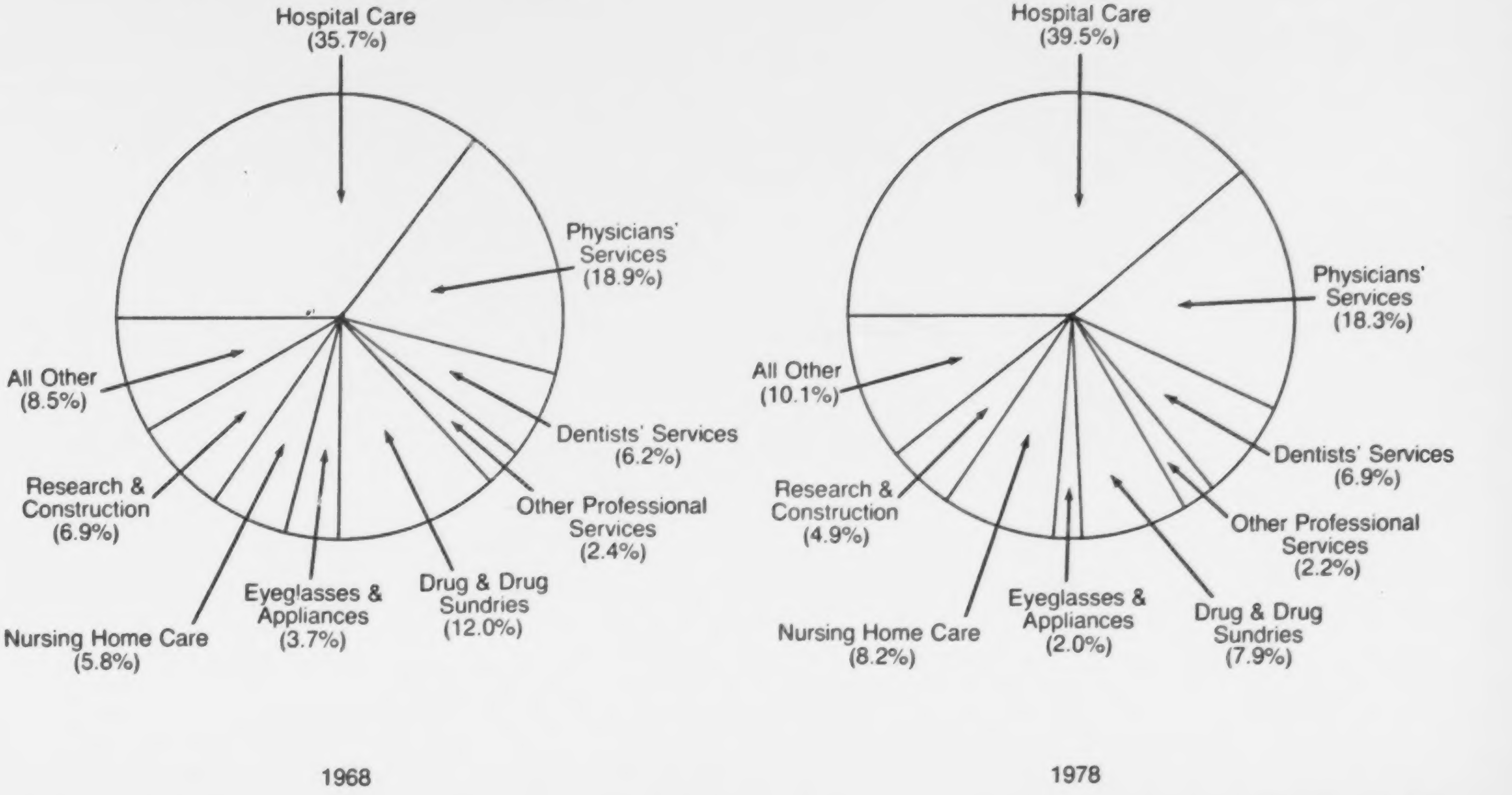
Table 31—National Health Expenditures by Type of Expenditure, 1968 and 1978

Type of Expenditure	1968 Amount (in millions)	1968 Percent	1968 Per Capita	1978^{a} Amount (in millions)	1978^{a} Percent	1978^{a} Per Capita
Total Expenditures	$58,864	100.0%	$288.17	$192,448	100.0%	$863.01
Health services and supplies	54,797	93.1	268.25	183,007	95.1	820.68
Personal health care	51,543	87.6	252.32	167,911	87.3	752.98
Hospital care	21,016	35.7	102.88	76,025	39.5	340.93
Physicians' services	11,104	18.9	54.36	35,250	18.3	158.08
Dentists' services	3,673	6.2	17.98	13,300	6.9	59.64
Other professional services	1,424	2.4	6.97	4,275	2.2	19.17
Drugs and drug sundries	7,044	12.0	34.48	15,098	7.9	67.70
Eyeglasses and appliances	2,161	3.7	10.58	3,879	2.0	17.40
Nursing-home care	3,383	5.8	16.56	15,751	8.2	70.64
Other health services	1,739	3.0	8.51	4,333	2.3	19.43
Expenses for prepayment and administration	2,156	3.7	10.55	10,022	5.2	44.94
Government public health activities	1,098	1.9	5.37	5,073	2.6	22.75
Research & medical facilities Construction	4,068	6.9	19.91	9,441	4.9	42.34
Research	1,817	3.1	8.89	4,287	2.2	19.23
Construction	2,251	3.8	11.02	5,154	2.7	23.11

Note: Components may not add to totals because of rounding. [a]Preliminary estimates.

Source: Gibson, R. M.: National Health Expenditures, 1978. Health Care Financing Review 1:1-36, Summer 1979.

Figure 15—Percentage Distribution of Total National Health Expenditures by Type of Expenditure, 1968 and 1978



Source: Table 31

Table 32—Aggregate, Per Capita, and Percentage Distribution of Personal Health Care Expenditures by Type of Expenditure, Selected Years 1950-1978

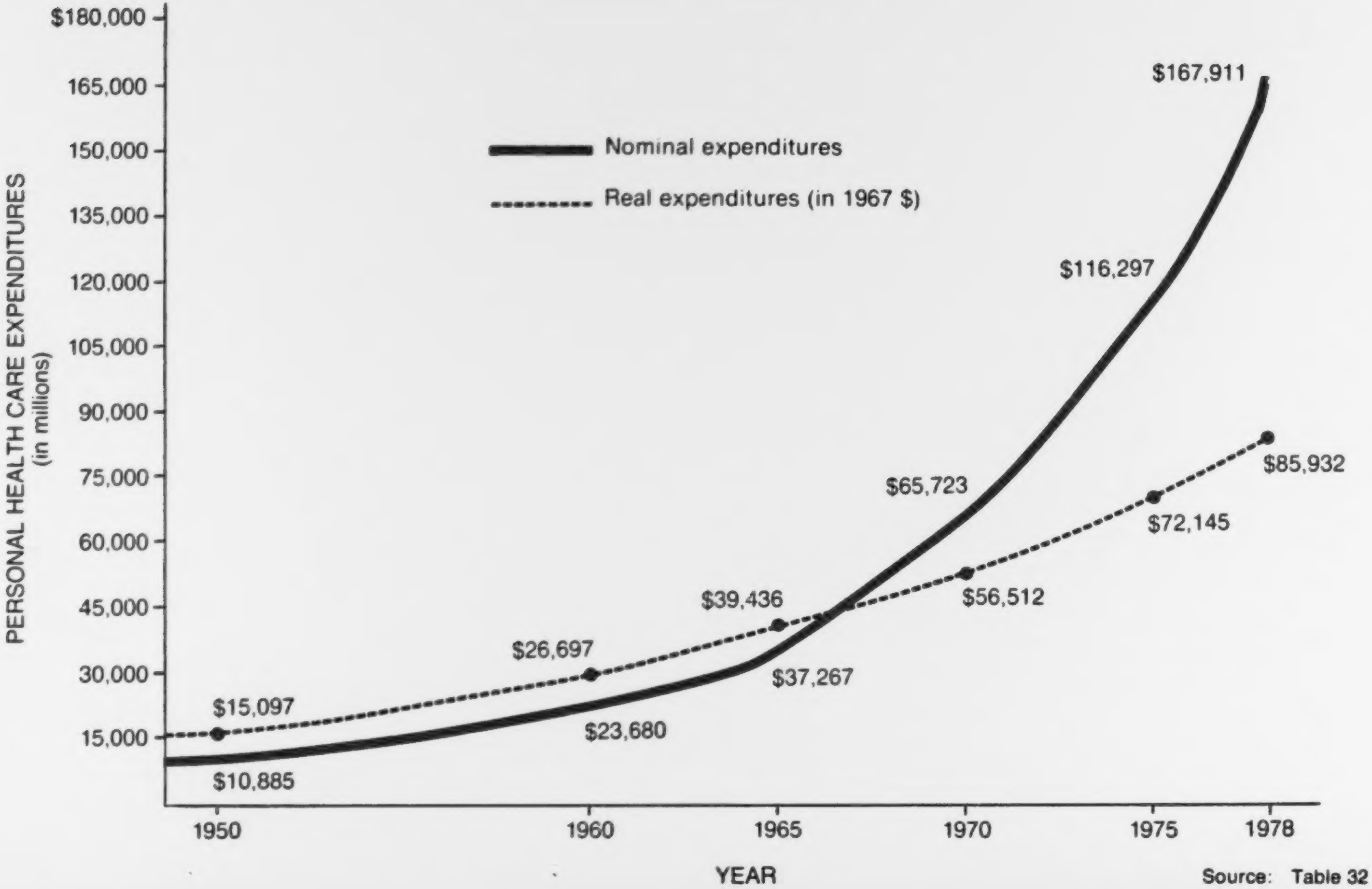
	Total--All Personal Health Care Services			Hospital Care			Physicians' Services			All Other Personal Health Care Services[a]		
Year	Total[b]	Per Capita	Per-cent	Total[b]	Per Capita	Per-cent	Total[b]	Per Capita	Per-cent	Total[b]	Per Capita	Per-cent
1950	$ 10,885	$ 70.37	100.0	$ 3,851	$ 24.90	35.4	$ 2,747	$ 17.76	25.2	$ 4,287	$ 27.72	39.4
1960	23,680	128.81	100.0	9,092	49.46	38.4	5,684	30.92	24.0	8,904	48.44	37.6
1965	37,267	188.42	100.0	13,935	70.46	37.4	8,474	42.85	22.7	14,857	75.12	39.9
1970	65,723	315.37	100.0	27,799	133.39	42.3	14,340	68.81	21.8	23,584	113.17	35.9
1971	72,115	342.52	100.0	30,769	146.14	42.7	15,918	75.60	22.1	25,429	120.78	35.3
1972	79,870	376.14	100.0	34,974	164.71	43.8	17,162	80.82	21.5	27,734	130.61	34.7
1973	88,471	413.53	100.0	38,585	180.35	43.6	19,075	89.16	21.6	30,812	144.02	34.8
1974	100,885	467.72	100.0	44,857	207.97	44.5	21,245	98.49	21.1	34,783	161.26	34.5
1975	116,297	534.82	100.0	52,138	239.77	44.8	24,932	114.66	21.4	39,227	180.39	33.7
1976[c]	132,127	602.45	100.0	59,806	272.69	45.3	27,658	126.11	20.9	44,663	203.65	33.8
1977[c]	149,139	674.46	100.0	67,914	307.13	45.5	31,242	141.29	20.9	49,983	226.04	33.5
1978[d]	167,911	752.98	100.0	76,025	340.93	45.3	35,250	158.08	21.0	56,637	253.98	33.7

Note: Includes all expenditures for health services and supplies other than expenses for prepayment and administration and government public health activities.

[a] Includes dentists' services, other professional services, drugs and drug sundries, eyeglasses and appliances, nursing-home care, and other health services. [b] In millions. [c] Revised estimates. [d] Preliminary estimates.

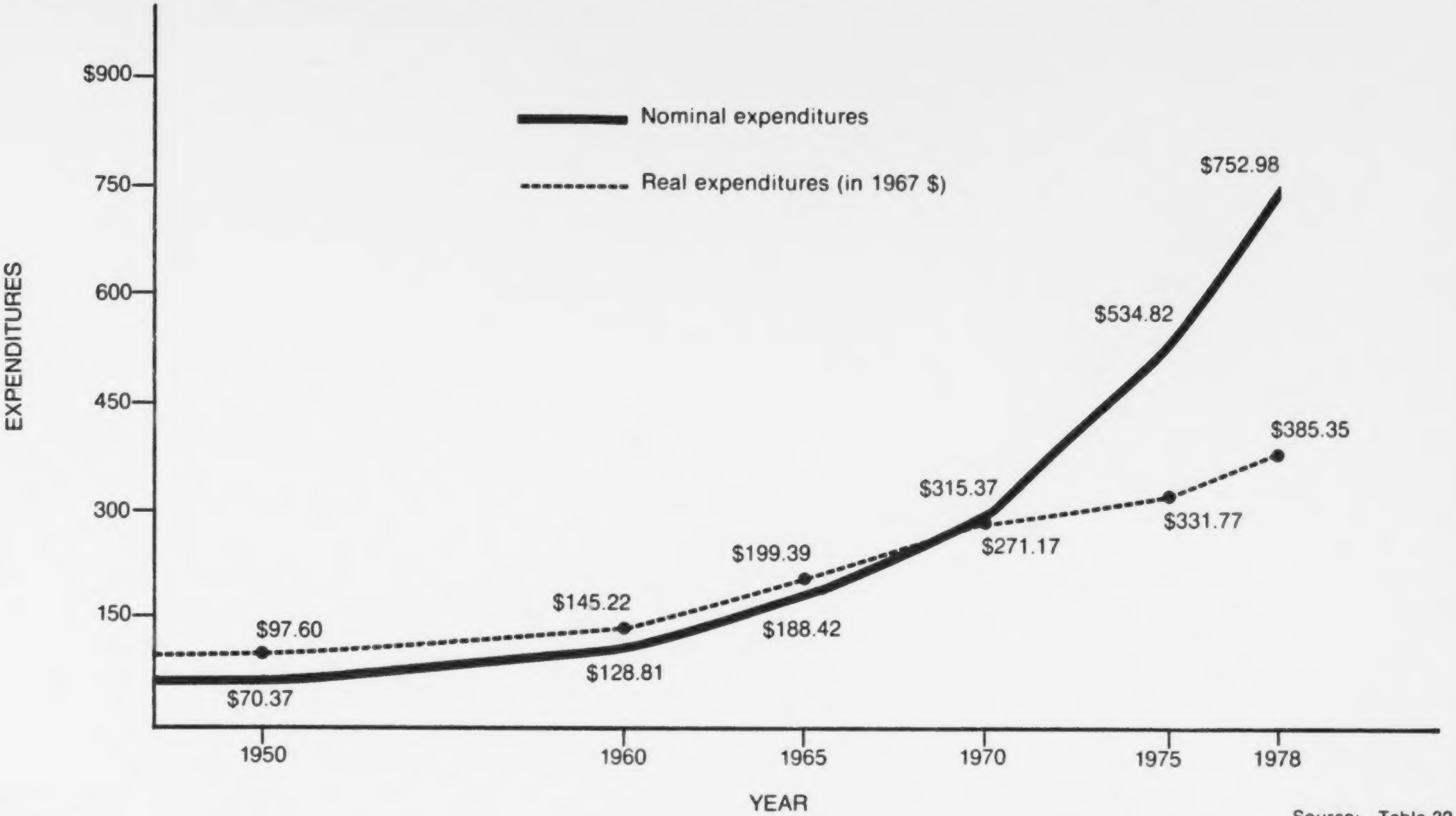
Source: Gibson, R. M.: National Health Expenditures, 1978. Health Care Financing Review 1:1-36, Summer 1979.

Figure 16—Personal Health Care Expenditures, Selected Years 1950-1978



Source: Table 32

Figure 17—Per Capita Personal Health Care Expenditures, Selected Years 1950-1978



Source: Table 32

Table 33—Estimated Total and Per Capita Personal Health Expenditures for Three Age Groups by Type of Expenditure, 1974 and 1977

	All Ages		Under 19		19-64		65 and Over	
Type of Expenditure	Total[a]	Per Capita	Total[a]	Per Capita	Total[a]	Per Capita	Total[a]	Per Capita
Total Expenditures--1974	$ 91,315	$425.15	$14,741	$201.06	$52,396	$437.80	$24,179	$1,109.54
Hospital care	41,020	190.98	5,131	69.99	25,319	211.56	10,570	485.05
Physicians' services	19,742	91.92	4,454	60.75	11,395	95.21	3,893	178.65
Dentists' services	6,870	31.99	1,573	21.46	4,754	39.72	543	24.91
Other professional services	1,929	8.98	434	5.92	1,114	9.31	381	17.47
Drugs and drug sundries	9,416	43.84	1,803	24.59	5,299	44.28	2,315	106.21
Eyeglasses and appliances	1,674	7.79	278	3.79	1,030	8.60	366	16.80
Nursing-home care	7,450	34.69	134	1.83	1,617	13.51	5,699	261.53
Other health services	3,214	14.96	934	12.74	1,868	15.61	412	18.92
Total Expenditures--1977[b]	$142,586	$646.11	$17,909	$252.96	$83,422	$660.78	$41,256	$1,745.17
Hospital care	65,637	297.38	6,333	89.45	41,109	325.62	18,185	769.25
Physicians' services	32,184	145.84	4,924	69.55	20,115	159.33	7,145	302.23
Dentists' services	10,020	45.41	2,144	30.29	6,854	54.29	1,022	43.24
Other professional services	3,212	14.56	305	4.31	2,091	16.56	816	34.51
Drugs and drug sundries	12,516	56.72	2,319	32.76	7,338	58.13	2,859	120.94
Eyeglasses and appliances	2,086	9.45	270	3.81	1,505	11.92	312	13.20
Nursing-home care	12,618	57.18	341	4.81	1,741	13.79	10,536	445.68
Other health services	4,322	19.59	1,272	17.97	2,669	21.14	381	16.12

[a] In millions. [b] Preliminary estimates.

Sources: Gibson, R.M. *et al.*: Age Differences in Health Care Spending, Fiscal Year 1976. *Social Security Bulletin* 40:3-14, August 1977.

Gibson, R.M., Fisher, C.R.: Age Differences in Health Care Spending, Fiscal Year 1977. *Social Security Bulletin* 42:3-16, January 1979.

Table 34—Social Welfare Expenditures Under Public Programs, Selected Fiscal Years 1950-1978

Fiscal Year	Total Social Welfare	Expenditures by Program (millions)						
		Social Insurance	Public Aid	Health & Medical Programs	Veterans' Programs	Education	Housing	Other Social Welfare
1950	$ 23,508.4	$ 4,946.6	$ 2,496.2	$ 2,063.5	$ 6,865.7	$ 6,674.1	$ 14.6	$ 447.7
1960	52,293.3	19,306.7	4,101.1	4,463.8	5,479.2	17,626.2	176.8	1,139.4
1965	77,175.3	28,122.8	6,283.4	6,246.4	6,031.0	28,107.9	318.1	2,065.7
1970	145,855.7	54,691.2	16,487.8	9,906.8	9,078.0	50,845.5	701.2	4,145.2
1971	171,907.9	66,368.7	21,262.0	11,086.7	10,456.0	56,704.7	1,046.8	4,983.0
1972	191,357.0	74,809.4	26,078.3	12,865.7	11,522.4	59,385.1	1,332.4	5,363.9
1973	213,941.8	86,165.5	28,691.3	13,447.1	13,026.4	64,733.7	2,179.6	5,698.2
1974[a]	239,396.7	99,001.5	31,520.3	14,953.1	14,112.4	70,533.9	2,554.0	6,721.5
1975[a]	290,064.0	123,013.1	40,706.1	17,787.7	17,018.8	80,833.4	3,172.3	7,532.6
1976[a]	331,998.0	145,591.0	47,985.3	19,273.0	19,005.0	87,720.5	3,370.8	9,051.5
1977[a]	361,553.0	160,867.0	52,895.0	20,438.0	19,015.3	94,421.0	4,358.0	9,559.0
1978[b]	394,462.0	175,101.0	59,620.0	23,004.0	19,742.0	101,188.0	5,225.0	10,583.0

Note: Represents expenditures under public law and from trust accounts, including administration, capital outlay, and some payments outside the United States. [a]Revised estimates. [b]Preliminary estimates.

Source: McMillan, A. W., Bixby, A. K.: Social Welfare Expenditures, Fiscal Year 1978. *Research and Statistics Note* No. 2, February 14, 1980.

Financing Mechanisms for the Provision of Health Services

For the majority of the U.S. population, the present system for financing health care services--through private insurance and government programs--has been successful in providing access to care. The growth of private and government insurance and prepayment programs has been associated with increased expenditures and better protection against the financial consequences of unexpected illnesses.

- In 1978, 59.4 percent of total health expenditures were paid with private funds, down from 75.1 percent in 1965. 61.3 percent of personal health care expenditures were financed by private funds.
- In 1978, only 46.2 percent of personal expenditures for hospital care were financed by private funds. 73.2 percent of expenditures on physicians' services were private.
- Of the total personal health care expenditures for the aged in 1977, 67.0 percent ($27.6 billion) were paid by public funds. Medicare accounted for almost two-thirds of this amount. 88.2 percent of hospital expenditures and 59.6 percent of expenditures for physicians' services for the aged were public funds.
- Public assistance vendor medical payments, or Medicaid, increased 24.5 percent, from $15.6 billion in 1976 to $19.4 billion in 1978.
- In 1977, an estimated 168.2 million different Americans, or 78.0 percent of the civilian population, were protected by some form of private health insurance.
- 49.3 million different Americans (22.8 percent) had private dental care insurance in 1977.
- In 1977, $41.6 billion were paid in private insurance benefits, compared to $15.7 billion in 1970.

Table 35—Consumer Price Index, Selected Years 1950-1979

Item	Year 1950	1960	1965	1970	1972	1973	1974	1975	1976	1977	1978	1979
All Items	72.1	88.7	94.5	116.3	125.3	133.1	147.7	161.2	170.5	181.5	195.4	217.4
Less medical care	NA	89.4	94.9	116.1	124.9	132.9	147.7	160.9	169.7	180.3	194.0	216.1
Medical care	53.7	79.1	89.5	120.6	132.5	137.7	150.5	168.6	184.7	202.4	219.4	239.7
Food	74.5	88.0	94.4	114.9	123.5	141.4	161.7	175.4	180.8	192.2	211.4	234.5
Apparel and upkeep	79.0	89.6	93.7	116.1	122.3	126.8	136.2	142.3	147.6	154.2	159.6	166.6
Housing	72.8	90.2	94.9	118.2	128.1	133.7	148.8	164.5	174.6	186.5	202.8	227.6
Transportation	68.2	89.6	95.9	112.7	119.9	123.8	137.7	150.6	165.5	177.2	185.5	212.0
Entertainment	NA	NA	NA	116.7	126.5	130.0	139.8	152.2	159.8	167.7	176.6	188.5
Other goods and services	NA	NA	NA	116.8	127.5	132.5	142.0	153.9	162.7	172.2	183.3	196.7
All services	58.7	83.5	92.2	121.6	133.3	139.1	152.1	166.6	180.4	194.3	210.9	234.2
Energy	NA	94.2	96.3	107.0	114.3	123.5	159.7	176.6	189.3	207.3	220.4	275.9

Note: 1967 = 100; data are annual averages; data beginning 1978 are for all urban consumers; earlier data are for urban wage earners and clerical workers.

NA indicates not available.

Sources: U.S. Office of the President: Economic Report of the President. Government Printing Office, 1980:259,262.

U.S. Dept. Labor, Bur. Labor Statistics: CPI Detailed Reports.

Table 36—Medical Care Component of the Consumer Price Index, Selected Years 1950-1979

Item	Year 1950	1960	1965	1970	1972	1973	1974	1975	1976	1977	1978	1979
Medical care total	53.7	79.1	89.5	120.6	132.5	137.7	150.5	168.6	184.7	202.4	219.4	239.7
Medical care services	49.2	74.9	87.3	124.2	138.2	144.3	159.1	179.1	197.1	216.7	235.4	258.3
Physicians' services	55.2	77.0	88.3	121.4	133.8	138.2	150.9	169.4	188.5	206.0	223.1	243.6
Dentists' services	63.9	82.1	92.2	119.4	132.3	136.4	146.8	161.9	172.2	185.1	198.1	214.8
Semi-private hosp. room	30.3	57.3	75.9	145.4	173.9	182.1	201.5	236.1	268.6	299.5	332.4	370.3
Prescription drugs	92.6	115.3	102.0	101.2	100.9	100.5	102.9	109.3	115.2	122.1	131.6	141.8
Over-the-counter drugs	NA	NA	98.0	106.2	111.3	112.4	117.5	130.1	138.9	148.5	159.0	170.7

Note: 1967 = 100; data are annual averages; data beginning 1978 are for all urban consumers; earlier data are for urban wage earners and clerical workers.

NA indicates not available.

Sources: Medical Care Component of the Consumer Price Index for Urban Wage and Clerical Workers, 1940-79. Social Security Bulletin 42:63, December 1979.

U.S. Dept. Labor, Bur. Labor Statistics: CPI Detailed Reports.

Table 37—Annual Percentage Change in the Consumer Price Index, 1965-1979

Item	Annual Percentage Change in the Annual Average CPI 1965 -66	1966 -67	1968 -69	1969 -70	1970 -71	1972 -73	1973 -74	1974 -75	1975 -76	1976 -77	1977 -78	1978 -79
All Items	2.9	2.9	5.4	5.9	4.3	6.2	11.0	9.1	5.8	6.5	7.7	11.3
Less medical care	3.0	2.4	5.4	5.8	4.1	6.4	11.1	8.9	5.5	6.2	7.6	11.4
Medical care	4.4	7.1	6.9	6.3	6.5	3.9	9.3	12.0	9.5	9.6	8.4	9.3
Food	5.0	0.9	5.1	5.5	3.0	14.5	14.4	8.5	3.1	6.3	10.0	10.9
Apparel and upkeep	2.6	4.1	5.8	4.1	3.2	3.7	7.4	4.5	3.7	4.5	3.5	4.4
Housing	2.4	2.9	6.2	7.1	4.4	4.4	11.3	10.6	6.1	6.8	8.7	12.2
Transportation	1.4	2.9	3.9	5.1	5.2	3.3	11.2	9.4	9.9	7.1	4.7	14.3
Entertainment	NA	NA	5.0	5.1	5.3	2.8	7.5	8.9	5.0	4.9	5.3	6.7
Other goods and services	NA	NA	4.9	5.8	4.8	3.9	7.2	8.4	5.7	5.8	6.4	7.3
All services	3.9	4.4	6.9	8.1	5.6	4.4	9.3	9.5	8.3	7.7	8.5	11.0
Energy	1.6	2.2	2.7	2.7	3.9	8.0	29.3	10.6	7.2	9.5	6.3	25.2

Note: Data are annual averages; data beginning 1978 are for all urban consumers; earlier data are for urban wage earners and clerical workers.

NA indicates not available.

Sources: U.S. Office of the President: Economic Report of the President. U.S. Government Printing Office, 1980:259,262.

U.S. Dept. Labor, Bur. Labor Statistics: CPI Detailed Reports.

Table 38—Annual Percentage Change in the Medical Care Component of the Consumer Price Index, 1965-1979

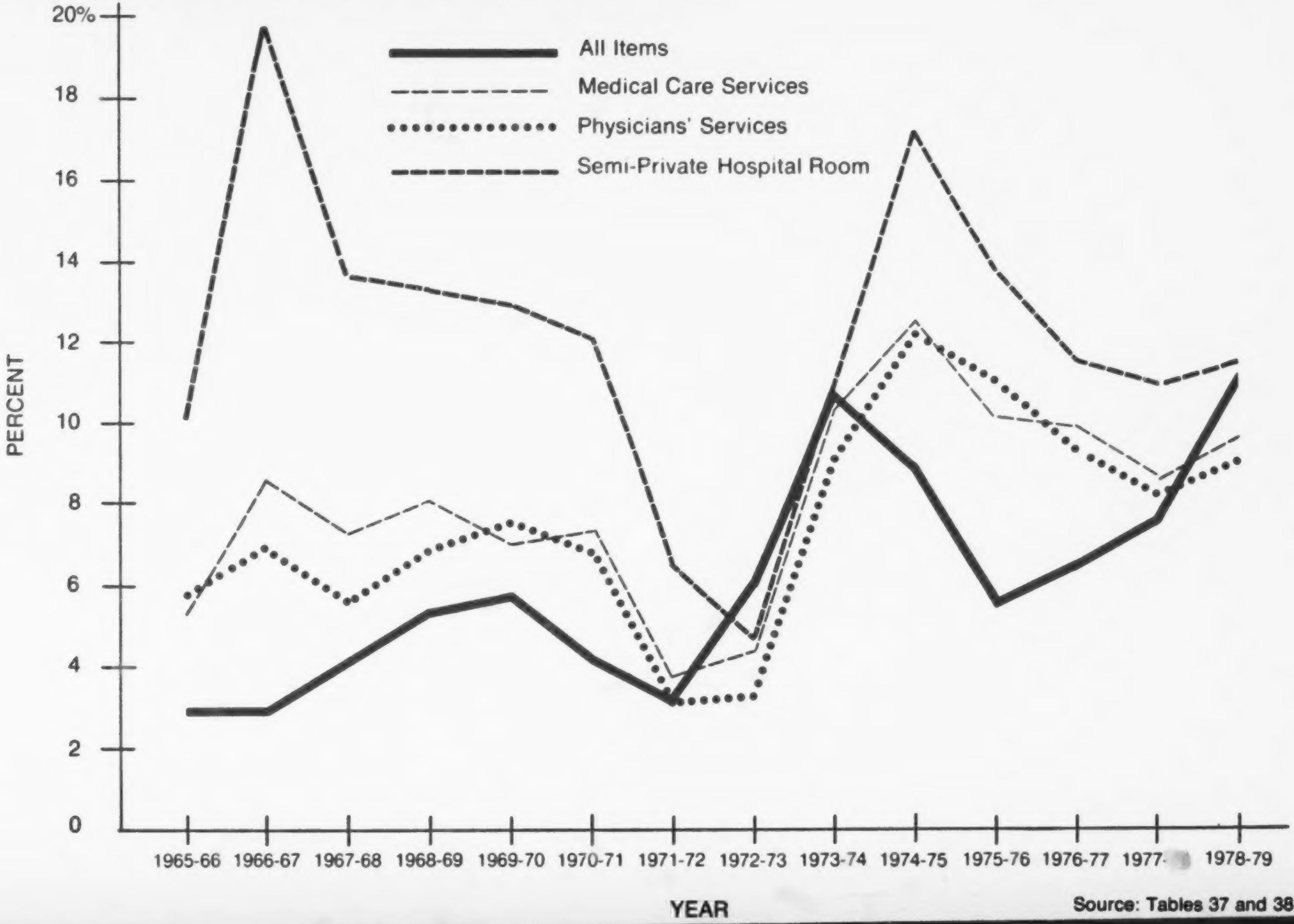
	Annual Percentage Change in the Annual Average CPI												
Item	1965 -66	1966 -67	1967 -68	1968 -69	1969 -70	1970 -71	1972 -73	1973 -74	1974 -75	1975 -76	1976 -77	1977 -78	1978 -79
Medical care total	4.4	7.1	6.1	6.9	6.3	6.5	3.9	9.3	12.0	9.5	9.6	8.4	9.3
Medical care services	5.4	8.7	7.3	8.1	7.1	7.3	4.4	10.3	12.6	10.1	9.9	8.6	9.7
Physicians' services	5.8	7.1	5.6	6.9	7.5	6.9	3.3	9.2	12.3	11.3	9.3	8.3	9.2
Dentists' services	3.3	5.0	5.5	7.0	5.8	6.4	3.1	7.6	10.3	6.4	7.5	7.0	8.4
Semi-private hospital room	10.0	19.8	13.6	13.4	12.9	12.2	4.7	10.7	17.2	13.8	11.5	11.0	11.4
Prescription drugs	-0.2	-1.8	-1.7	1.3	1.6	0.1	-0.4	2.4	6.2	5.4	6.0	7.8	7.8
Over-the-counter drugs	1.0	1.0	2.5	0.7	2.9	3.9	1.0	4.5	10.7	6.8	6.9	7.1	7.4

Note: Data are annual averages; data beginning 1978 are for all urban consumers; earlier data are for urban wage earners and clerical workers.

Sources: Medical Care Component of the Consumer Price Index for Urban Wage and Clerical Workers, 1940-79. Social Security Bulletin 42:63, December 1979.

U.S. Dept. Labor, Bur. Labor Statistics: CPI Detailed Reports.

Figure 18—Annual Percentage Change for Selected Items in the Consumer Price Index, 1965-1979



Source: Tables 37 and 38

Table 39—National Health Expenditures by Source of Funds, Selected Years 1929-1978

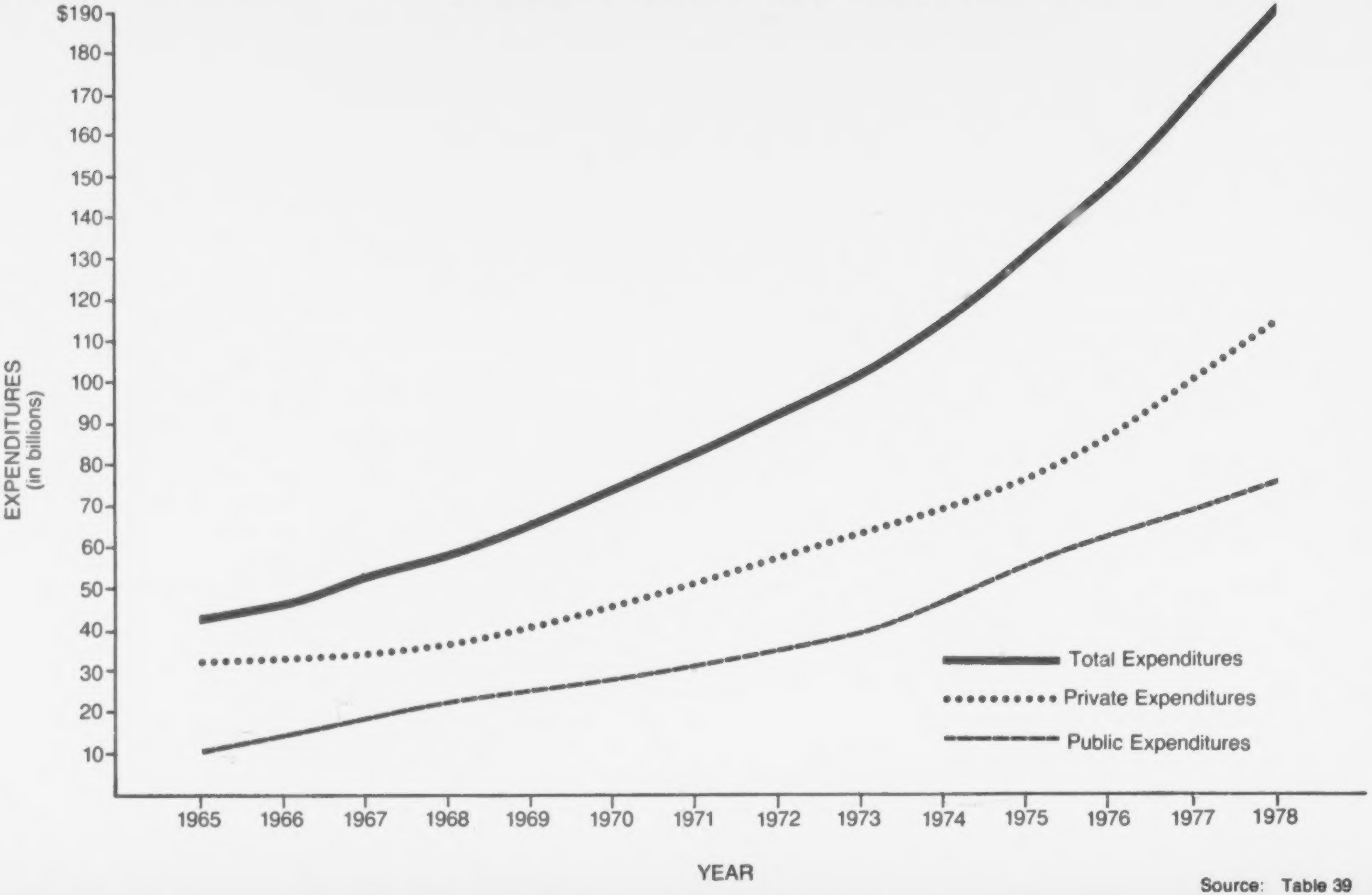
	Health Expenditures								
	Total			Private			Public		
Year	Amount (billions)	Per Capita	% of GNP	Amount (billions)	Per Capita	% of Total	Amount (billions)	Per Capita	% of Total
1929	$ 3.6	$ 29.49	100.0%	$ 3.2	$ 25.49	86.4%	$ 0.5	$ 4.00	13.6%
1935	2.9	22.65	100.0	2.4	18.30	80.8	0.6	4.34	19.2
1940	4.0	29.62	100.0	3.2	23.61	79.7	0.8	6.03	20.3
1950	12.7	81.86	100.0	9.2	59.62	72.8	3.4	22.24	27.2
1955	17.7	105.38	100.0	13.2	78.33	74.3	4.6	27.05	25.7
1960	26.9	146.30	100.0	20.3	110.20	75.3	6.6	36.10	24.7
1965	43.0	217.42	100.0	32.3	163.29	75.1	10.7	54.13	24.9
1970	74.7	358.63	100.0	47.5	227.71	63.5	27.3	130.93	36.5
1971	82.8	393.09	100.0	51.4	244.12	62.1	31.4	148.97	37.9
1972	92.7	436.47	100.0	57.7	271.78	62.3	35.0	164.69	37.7
1973	102.3	478.38	100.0	63.6	297.17	62.1	38.8	181.22	37.9
1974	115.6	535.99	100.0	69.0	319.99	59.7	46.6	216.00	40.3
1975	131.5	604.57	100.0	75.8	348.61	57.7	55.7	255.95	42.3
1976	148.9	678.79	100.0	86.6	394.73	58.2	62.3	284.06	41.8
1977[a]	170.0	768.77	100.0	100.7	455.27	59.2	69.3	313.50	40.8
1978[b]	192.4	863.01	100.0	114.3	512.62	59.4	78.1	350.40	40.6

Note: Components may not add to total because of rounding.

[a] Revised estimates. [b] Preliminary estimates.

Source: Gibson, R.M.: National Health Expenditures, 1978. Health Care Financing Review 1:1-36, Summer 1979.

Figure 19—National Health Expenditures by Source of Funds, 1965-1978



Source: Table 39

Table 40—National Health Expenditures by Type of Expenditure and Source of Funds, 1978

Type of Expenditure	Total Expenditures	Private Funds			Public Funds		
		Total	Direct Payment	Other	Total	Federal	State & Local
Total	$192,448	$114,311	$55,317	$58,994	$78,136	$53,725	$24,411
Health services & supplies	183,007	110,780	55,317	55,463	72,227	49,435	22,792
Hospital care	76,025	35,107	7,534	27,573	40,918	30,344	10,574
Physicians' services	35,250	25,811	12,013	13,798	9,439	7,066	2,374
Dentists' services	13,300	12,761	10,213	2,548	539	310	229
Other professional services	4,275	3,303	2,233	1,070	972	677	295
Drugs and drug sundries	15,098	13,798	12,667	1,131	1,300	667	634
Eyeglasses and appliances	3,879	3,522	3,478	44	357	285	72
Nursing-home care	15,751	7,394	7,179	214	8,358	4,715	3,643
Other health services	4,333	1,175	--	1,175	3,158	2,440	719
Expenses for prepayment and administration	10,022	7,910	--	7,910	2,112	1,729	384
Government public health activities	5,073	--	--	--	5,073	1,204	3,869
Research & medical facilities							
Construction	9,441	3,532	--	3,532	5,910	4,290	1,620
Research[a]	4,287	296	--	296	3,991	3,680	312
Construction	5,154	3,236	--	3,236	1,918	610	1,308

Note: Preliminary estimates. Expenditures in millions of dollars. Components may not add to total because of rounding. [a]Research expenditures of drug companies and other producers of medical supplies excluded from research expenditures, but included in the expenditure class in which the product falls.

Source: Gibson, R. M.: National Health Expenditures, 1978. Health Care Financing Review 1:1-36, Summer 1979.

Table 41—Aggregate, Per Capita, and Percentage Distribution of Personal Health Care Expenditures by Source of Funds, Selected Years 1950-1978

				Source of Funds					
	Total			Private			Public		
Year	Aggregate	Per Capita	Percentage	Aggregate	Per Capita	Percentage	Aggregate	Per Capita	Percentage
1950	$ 10,885	$ 70.37	100.0%	$ 8,445	$ 54.60	77.6%	$ 2,440	$ 15.78	22.4%
1955	15,708	93.29	100.0	12,100	71.86	77.0	3,608	21.43	23.0
1960	23,680	128.81	100.0	18,523	100.76	78.2	5,157	28.05	21.8
1965	37,267	188.42	100.0	29,387	148.58	78.9	7,880	39.84	21.1
1970	65,723	315.37	100.0	43,281	207.68	65.9	22,442	107.69	34.1
1971	72,115	342.52	100.0	46,395	220.36	64.3	25,721	122.16	35.7
1972	79,870	376.14	100.0	51,042	240.38	63.9	28,828	135.76	36.1
1973	88,471	413.53	100.0	56,408	263.66	63.8	32,063	149.87	36.2
1974	100,885	467.72	100.0	62,266	288.67	61.7	38,619	179.05	38.3
1975	116,297	534.82	100.0	70,164	322.66	60.3	46,133	212.15	39.7
1976[a]	132,127	602.45	100.0	80,531	367.19	60.9	51,596	235.26	39.1
1977[a]	149,139	674.46	100.0	91,048	411.75	61.0	58,091	262.71	39.0
1978[b]	167,911	752.98	100.0	102,870	461.31	61.3	65,042	291.67	38.7

Note: Includes all expenditures for health services and supplies other than expenses for prepayment and administrative and government public health activities.

[a] Revised estimates. [b] Preliminary estimates.

Source: Gibson, R. M.: National Health Expenditures, 1978. Health Care Financing Review 1:1-36, Summer 1979.

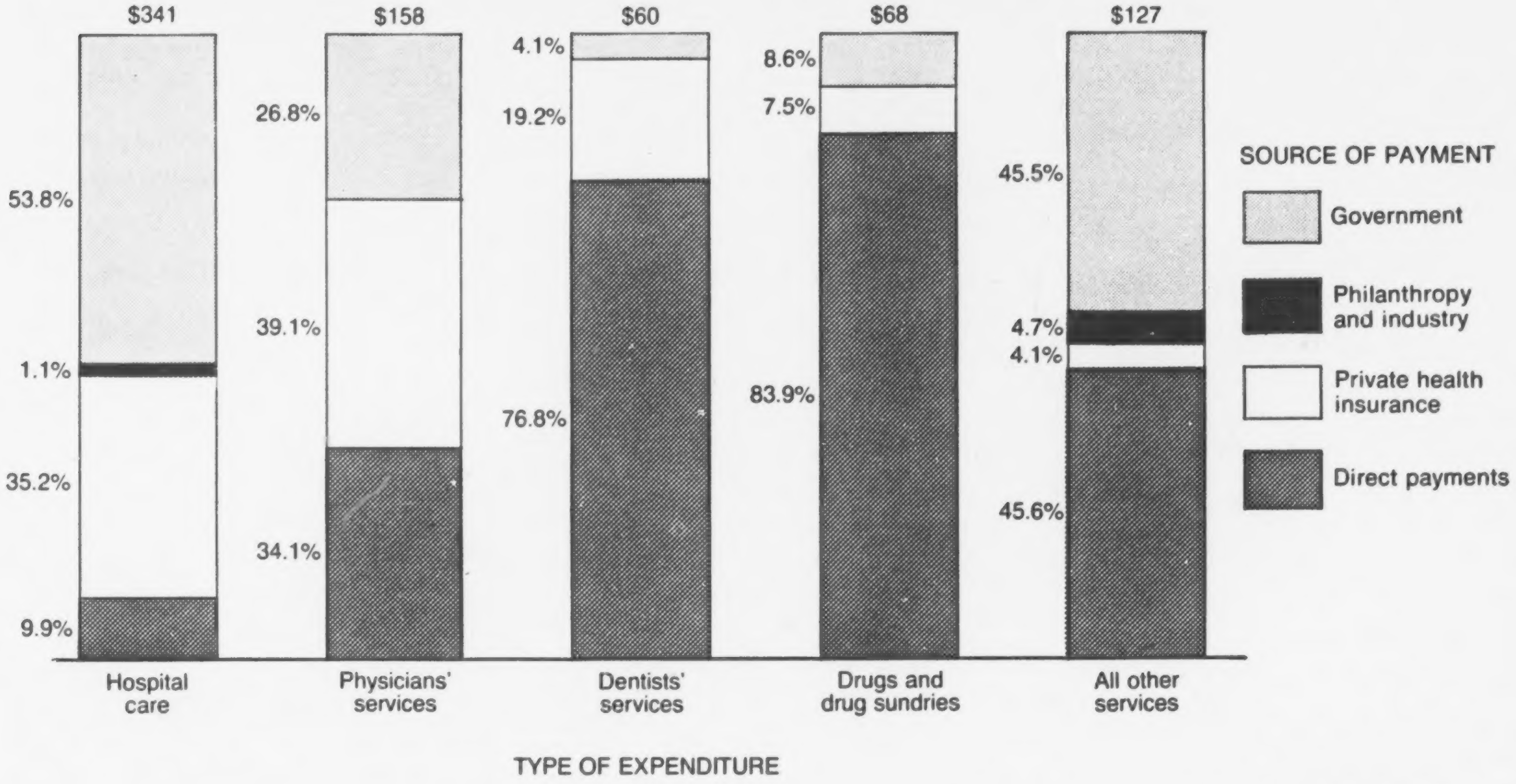
Table 42—Total and Per Capita Personal Health Care Expenditures by Type of Expenditure and Source of Payment, 1978

Type of Expenditure	Total	Direct Payments	Third-Party Payments			
			Total	Private Health Insurance	Government	Philanthropy and Industry
Total	$167,911	$55,317	$112,594	$45,363	$65,042	$2,189
Hospital care	76,025	7,533	68,491	26,724	40,919	849
Physicians' services	35,250	12,013	23,237	13,779	9,439	19
Dentists' services	13,300	10,213	3,087	2,548	539	--
Other professional services	4,275	2,233	2,042	1,030	972	40
Drugs and drug sundries	15,098	12,667	2,431	1,131	1,300	--
Eyeglasses and appliances	3,879	3,478	401	44	357	--
Nursing-home care	15,751	7,179	8,572	108	8,358	106
Other health services	4,333	--	4,333	--	3,158	1,175
Total Per Capita	$ 752.98	$248.06	$ 504.92	$203.43	$291.67	$ 9.82
Hospital care	340.93	33.79	307.14	119.84	183.50	3.81
Physicians' services	158.08	53.87	104.21	61.79	42.33	0.09
Dentists' services	59.64	45.80	13.84	11.43	2.42	--
Other professional services	19.17	10.02	9.16	4.62	4.36	0.18
Drugs and drug sundries	67.70	56.80	10.90	5.07	5.83	--
Eyeglasses and appliances	17.40	15.60	1.80	0.20	1.60	--
Nursing-home care	70.64	32.19	38.44	0.48	37.48	0.48
Other health services	19.43	--	19.43	--	14.16	5.27

Note: Preliminary estimates. All expenditures expressed in millions of dollars.

Source: Gibson, R. M.: National Health Expenditures, 1978. Health Care Financing Review 1:1-36, Summer 1979.

Figure 20—Percentage Distribution of Per Capita Personal Health Care Expenditures by Type of Expenditure and Source of Payment, 1978



Source: Table 42

Table 43—Personal Health Care Expenditures for Three Age Groups, by Type of Expenditure and Source of Funds, Fiscal Years 1975-1977

	Amount (millions)								
	Under 19								
	1975[a]			1976[a]			1977[b]		
Type of Expenditures	Total	Private	Public	Total	Private	Public	Total	Private	Public
Total Personal Health Care	$14,393	$9,681	$4,711	$16,104	$10,987	$5,117	$17,909	$12,392	$5,517
Hospital care	5,007	2,635	2,372	5,646	3,067	2,580	6,333	3,448	2,885
Physicians' services	3,928	3,201	727	4,460	3,741	719	4,924	4,180	744
Dentists' services	1,788	1,590	198	1,956	1,749	207	2,144	1,925	220
Other professional services	248	149	100	278	158	120	305	169	136
Drug and drug sundries	1,843	1,708	136	1,964	1,814	150	2,319	2,161	158
Eyeglasses and appliances	247	228	19	269	249	21	270	248	21
Nursing-home care	190	91	99	252	120	132	341	162	178
Other health services	1,141	80	1,061	1,279	90	1,190	1,272	98	1,174

(continued)

Table 43 (Continued)

	Amount (millions)								
	19-64								
	1975[a]			1976[a]			1977[b]		
Type of Expenditures	Total	Private	Public	Total	Private	Public	Total	Private	Public
Total Personal Health Care	$65,006	$45,617	$19,389	$74,443	$52,951	$21,492	$83,422	$59,449	$23,973
Hospital care	31,238	17,091	14,147	36,074	20,526	15,548	41,109	23,840	17,269
Physicians' services	15,523	13,237	2,286	17,935	15,418	2,517	20,115	17,291	2,824
Dentists' services	5,455	5,246	209	6,129	5,911	218	6,854	6,620	234
Other professional services	1,595	1,394	201	1,850	1,601	248	2,091	1,794	298
Drug and drug sundries	6,619	6,156	463	7,184	6,670	513	7,338	6,790	549
Eyeglasses and appliances	1,308	1,224	85	1,452	1,360	92	1,505	1,405	100
Nursing-home care	1,131	479	652	1,370	577	794	1,741	737	1,004
Other health services	2,136	789	1,347	2,448	887	1,561	2,669	973	1,695

(continued)

Table 43 (Continued)

Type of Expenditures	Amount (millions)								
	65 and Over								
	1975[a]			1976[a]			1977[b]		
	Total	Private	Public[c]	Total	Private	Public[c]	Total	Private	Public[c]
Total Personal Health Care	$31,266	$10,331	$20,935	$35,670	$11,802	$23,868	$41,256	$13,624	$27,631
Hospital care	13,728	1,621	12,107	15,777	1,877	13,900	18,185	2,140	16,045
Physicians' services	5,103	1,944	3,159	6,108	2,469	3,640	7,145	2,889	4,255
Dentists' services	792	751	41	902	859	43	1,022	976	46
Other professional services	621	371	250	722	377	344	816	325	490
Drug and drug sundries	2,119	1,745	374	2,325	1,912	413	2,859	2,423	436
Eyeglasses and appliances	267	259	8	265	256	9	312	303	9
Nursing-home care	8,299	3,614	4,685	9,212	4,022	5,190	10,536	4,535	6,001
Other health services	339	27	312	360	30	330	381	33	348

[c] Continued on next page.

Table 43 (Continued)

	Amount (millions)											
	65 and Over (continued)											
	1975[a]				1976[a]				1977[b]			
Type of Expenditure	Total Public	Medi-care	Medi-caid	Other	Total Public	Medi-care	Medi-caid	Other	Total Public	Medi-care	Medi-caid	Other
Total	$20,935	$13,373	$5,373	$2,189	$23,868	$15,591	$5,917	$2,360	$27,631	$18,282	$6,890	$2,459
Hospital care	12,107	9,998	471	1,638	13,900	11,614	538	1,748	16,045	13,533	638	1,874
Physicians' services	3,159	2,894	216	50	3,640	3,374	211	55	4,255	3,975	221	60
Dentists' services	41	--	28	13	43	--	29	14	46	--	31	15
Other prof. services	250	206	40	4	344	288	51	5	490	425	61	4
Drugs & drug sundries	374	--	352	22	413	--	389	24	436	--	418	18
Eyeglasses & appliances	8	--	--	8	9	--	--	9	9	--	--	9
Nursing-home care	4,685	276	4,080	329	5,190	315	4,515	360	6,001	349	5,325	328
Other health services	312	--	186	125	330	--	184	146	348	--	196	152

[a] Revised estimates. [b] Preliminary estimates.

Source: Gibson, R.M., Fisher, C.R.: Age Differences in Health Care Spending, Fiscal Year 1977. Social Security Bulletin 42:3-16, January 1979.

Table 44—Percentage Distribution of Personal Health Care Expenditures for Three Age Groups, by Type of Expenditure and Source of Funds, Fiscal Years 1975-1977

Type of Expenditure	Under 19								
	1975[a]			1976[a]			1977[b]		
	Total	Private	Public	Total	Private	Public	Total	Private	Public
Total Personal Health Care	100.0	67.3	32.7	100.0	68.2	31.8	100.0	69.2	30.8
Hospital care	100.0	52.6	47.4	100.0	54.3	45.7	100.0	54.4	45.6
Physicians' services	100.0	81.5	18.5	100.0	83.9	16.1	100.0	84.9	15.1
Dentists' services	100.0	88.9	11.1	100.0	89.4	10.6	100.0	89.8	10.2
Other professional services	100.0	60.1	39.9	100.0	56.8	43.2	100.0	55.4	44.6
Drugs and drug sundries	100.0	92.7	7.3	100.0	92.4	7.6	100.0	93.2	6.8
Eyeglasses and appliances	100.0	92.3	7.7	100.0	92.6	7.4	100.0	91.8	8.2
Nursing-home care	100.0	47.9	52.1	100.0	47.6	52.4	100.0	47.5	52.5
Other health services	100.0	7.0	93.0	100.0	7.0	93.0	100.0	7.7	92.3

(continued)

Table 44 (Continued)

	19-64								
	1975[a]			1976[a]			1977[b]		
Type of Expenditure	Total	Private	Public	Total	Private	Public	Total	Private	Public
Total Personal Health Care	100.0	70.2	29.8	100.0	71.1	28.9	100.0	71.3	28.7
Hospital care	100.0	54.7	45.3	100.0	56.9	43.1	100.0	58.0	42.0
Physicians' services	100.0	85.3	14.7	100.0	86.0	14.0	100.0	86.0	14.0
Dentists' services	100.0	96.2	3.8	100.0	96.4	3.6	100.0	96.6	3.4
Other professional services	100.0	87.4	12.6	100.0	86.5	13.5	100.0	85.8	14.2
Drugs and drug sundries	100.0	93.0	7.0	100.0	92.9	7.1	100.0	92.5	7.5
Eyeglasses and appliances	100.0	93.6	6.4	100.0	93.7	6.3	100.0	93.4	6.6
Nursing-home care	100.0	42.4	57.6	100.0	42.1	57.9	100.0	42.3	57.7
Other health services	100.0	36.9	63.1	100.0	36.2	63.8	100.0	36.5	63.5

(continued)

Table 44 (Continued)

Type of Expenditure	65 and Over								
	1975[a]			1976[a]			1977[b]		
	Total	Private	Public[c]	Total	Private	Public[c]	Total	Private	Public[c]
Total Personal Health Care	100.0	33.0	67.0	100.0	33.1	66.9	100.0	33.0	67.0
Hospital care	100.0	11.8	88.2	100.0	11.9	88.1	100.0	11.8	88.2
Physicians' services	100.0	38.1	61.9	100.0	40.4	59.6	100.0	40.4	59.6
Dentists' services	100.0	94.8	5.2	100.0	95.2	4.8	100.0	95.5	4.5
Other professional services	100.0	59.7	40.3	100.0	52.2	47.8	100.0	39.9	60.1
Drugs and drug sundries	100.0	82.4	17.6	100.0	82.2	17.8	100.0	84.7	15.3
Eyeglasses and appliances	100.0	97.0	3.0	100.0	96.6	3.4	100.0	97.1	2.9
Nursing-home care	100.0	43.5	56.5	100.0	43.7	56.3	100.0	43.0	57.0
Other health services	100.0	8.0	92.0	100.0	8.3	91.7	100.0	8.7	91.3

[c] Continued on next page.

Table 44 (Continued)

	65 and Over (continued)											
	1975[a]				1976[a]				1977[b]			
Type of Expenditure	Total Public	Medicare	Medicaid	Other	Total Public	Medicare	Medicaid	Other	Total Public	Medicare	Medicaid	Other
Total Personal Health Care	67.0	42.7	17.2	7.0	66.9	43.7	16.6	6.6	67.0	44.3	16.7	6.0
Hospital care	88.2	72.8	3.4	11.9	88.1	73.6	3.4	11.1	88.2	74.4	3.5	10.3
Physicians' services	61.9	56.7	4.2	0.9	59.6	55.2	3.5	0.9	59.6	55.6	3.1	0.8
Dentists' services	5.2	--	3.5	1.7	4.8	--	3.2	1.6	4.5	--	3.0	1.5
Other professional services	40.3	33.2	6.4	0.7	47.8	39.9	7.1	0.7	60.1	52.1	7.5	0.5
Drugs and drug sundries	17.6	--	16.6	1.0	17.8	--	16.7	1.0	15.3	--	14.6	0.6
Eyeglasses and appliances	3.0	--	--	3.0	3.4	--	--	3.4	2.9	--	--	2.9
Nursing-home care	56.5	3.3	49.2	4.0	56.3	3.4	49.0	3.9	57.0	3.3	50.5	3.1
Other health services	92.0	--	54.9	37.1	91.7	--	51.1	40.6	91.3	--	51.4	39.9

[a] Revised estimates. [b] Preliminary estimates.

Source: Gibson, R.M., Fisher, C.R.: Age Differences in Health Care Spending, Fiscal Year 1977. Social Security Bulletin 42:3-16, January 1979.

Table 45—Expenditures Under Medicaid (Public Assistance Vendor Medical Payments) by Type of Expenditure, 1976, 1977, and 1978

	Expenditures (millions)					
	1976		1977		1978[a]	
Type of Expenditure	Amount	Percent	Amount	Percent	Amount	Percent
Total	$15,578	100.0%	$17,527	100.0%	$19,401	100.0%
Hospital care	5,688	36.5	6,435	36.7	6,854	35.3
Physicians' services	1,754	11.3	1,875	10.7	2,054	10.6
Dentists' services	381	2.4	407	2.3	444	2.3
Other professional services	275	1.8	339	1.9	394	2.0
Drugs & drug sundries	989	6.3	1,038	5.9	1,127	5.8
Eyeglasses & appliances	--	--	--	--	--	--
Nursing-home care	5,424	34.8	6,241	35.6	7,246	37.3
Other health services	340	2.2	322	1.8	246	1.3
Administration	728	4.7	871	5.0	1,036	5.3
Government public health activities	--	--	--	--	--	--

Note: Includes funds paid into Medicare trust funds by states under "buy-in" agreements to cover premiums for public assistance recipients and for persons who are medically indigent.

[a] Preliminary estimates.

Source: Gibson, R. M.: National Health Expenditures, 1978. Health Care Financing Review 1:1-36, Summer 1979.

Medical Education and Medical Manpower

The U.S. medical education system has provided the professional training for most of the physicians in the United States. Hence, the supply of physicians reflects the number and characteristics of students graduated from that system. The requirements for medical licensure in this country, however, affect all physicians practicing in the United States regardless of country of training.

The past decade has witnessed not only substantial growth in the number of medical schools and students graduated, but also significant changes in the type of student enrolled. Women, blacks, and other minorities are represented in increasing proportions of medical school graduates and licentiates.

The following data summarize some characteristics of the medical education and licensure system in the United States.

- The number of graduates from U.S. medical and basic science schools was 14,966 in 1978-1979, up 78.9 percent from the 1969-1970 academic year. In addition, the number of U.S. medical schools increased by 24 during the same period.
- Women represented 23.0 percent of all graduates from medical schools in 1978-1979, compared to 8.4 percent in 1969-1970. The proportion of women enrolled in medical school has increased from 9.0 percent in 1969-1970 to 24.4 percent in 1978-1979.
- U.S. minority groups enrolled in medical schools increased from 6.6 percent of total enrollment in 1972-1973 to 12.4 percent in 1978-1979.
- The proportion of foreign nationals enrolled in U.S. medical schools declined from 1.5 percent in 1972-1973 to 1.3 percent in 1978-1979.
- Although 29.9 percent of all U.S. families in 1976-1977 earned under $10,000, medical students from families in this income group constituted only 15.8 percent of all medical students enrolled.
- In 1979, 64,332 were enrolled in medical residency programs in the U.S., up from 52,685 in 1974. Slightly more than one-fourth of these residents were in internal medicine, followed in popularity by surgery and family practice.
- In 1978, 23.6 percent of new medical licentiates were graduates of foreign medical schools. The highest proportion of FMG licentiates (46.0 percent) was recorded in 1972 and has been decreasing since that time.

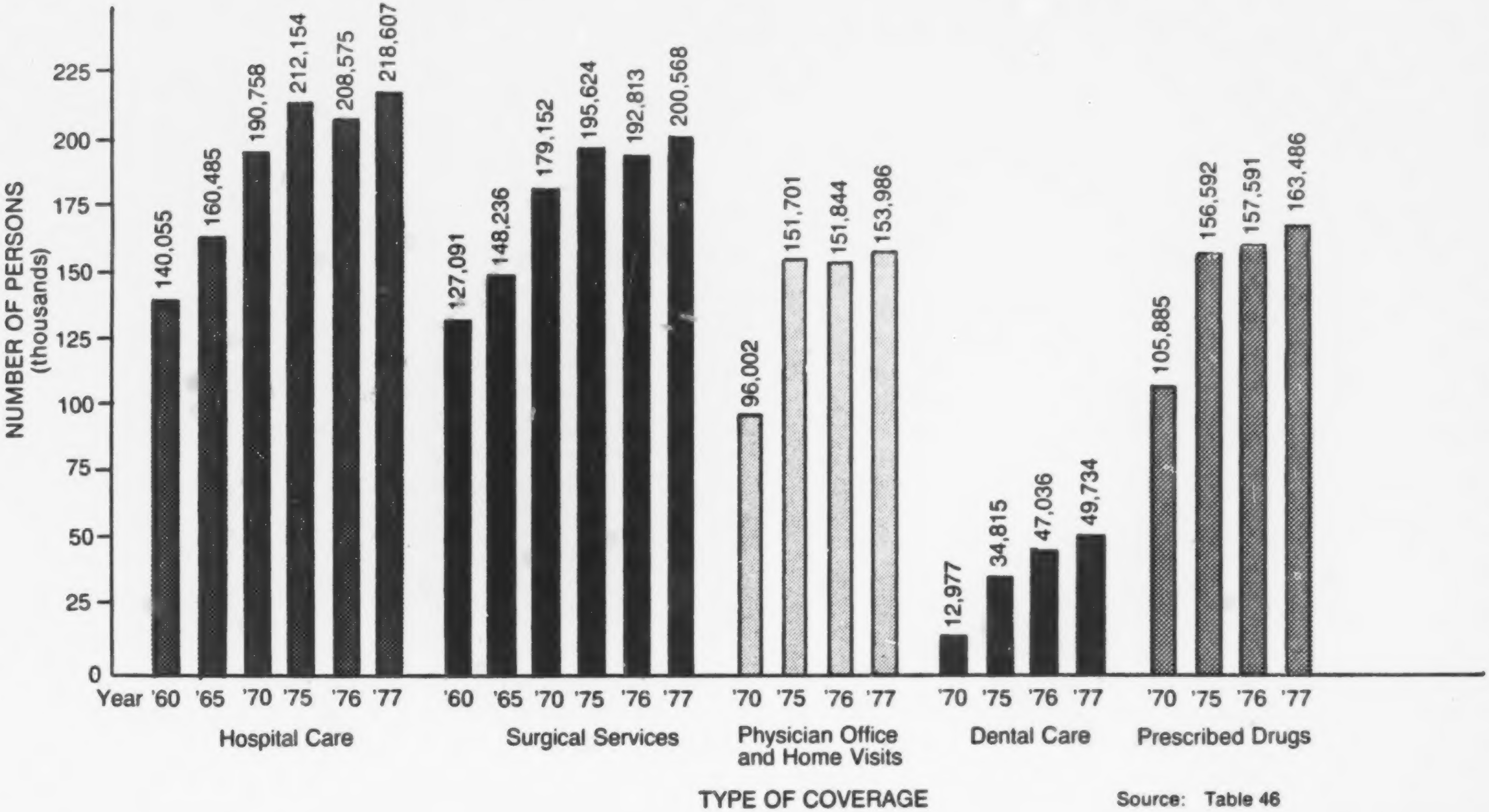
Table 46—Gross Enrollment Under Private Health Insurance Plans by Type of Coverage, Selected Years 1950-1977

Year	Hospital Care	M.D. Surgical Services	M.D. Office and Home Visits[a]	Dental Care[a]	Prescribed Drugs[a]	Private Duty Nursing[a]	Visiting Nurse Service[a]	Nursing Home Care[a]
1950	81,691	55,950						
1960	140,055	127,091						
1965	160,485	148,236						
1970	190,758	179,152	96,002	12,977	105,885	105,118	112,073	32,989
1972	197,195	183,936	104,735	18,750	117,082	114,269	121,520	46,315
1973	200,710	189,015	114,496	22,008	131,570	124,637	128,678	70,469
1974	206,646	193,172	150,612	32,896	149,244	148,113	143,382	71,202
1975	212,154	195,624	151,701	34,815	156,592	153,076	148,475	71,505
1976	208,575	192,813	151,844	47,036	157,591	153,817	152,566	71,782
1977	218,607	200,568	153,986	49,734	163,486	161,415	162,403	69,429
	Estimates of Net Number of Different Persons and Percent of Civilian Population Covered:							
				Number				
1975	162,378	160,244	127,735	34,477	149,276	145,927	141,561	70,146
1976	164,235	162,179	124,124	46,578	150,222	147,311	145,863	70,422
1977	168,212	163,864	121,711	49,250	149,896	148,584	151,788	65,889
				Percent				
1975	76.4	75.4	60.1	16.2	70.3	68.7	66.6	33.0
1976	76.8	75.8	58.0	21.8	70.2	68.9	68.2	32.9
1977	78.0	76.0	56.4	22.8	69.5	68.9	70.4	30.6

Note: All numbers are in thousands. [a]Data not available before 1966.

Source: Carroll, M. S., Arnett, R. H.: Private Health Insurance Plans in 1977: Coverage, Enrollment, and Financial Experience. Health Care Financing Review 1:3-22, Fall 1979.

Figure 21—Gross Enrollments Under Private Health Insurance Plans by Type of Coverage, Selected Years 1960-1977



Source: Table 46

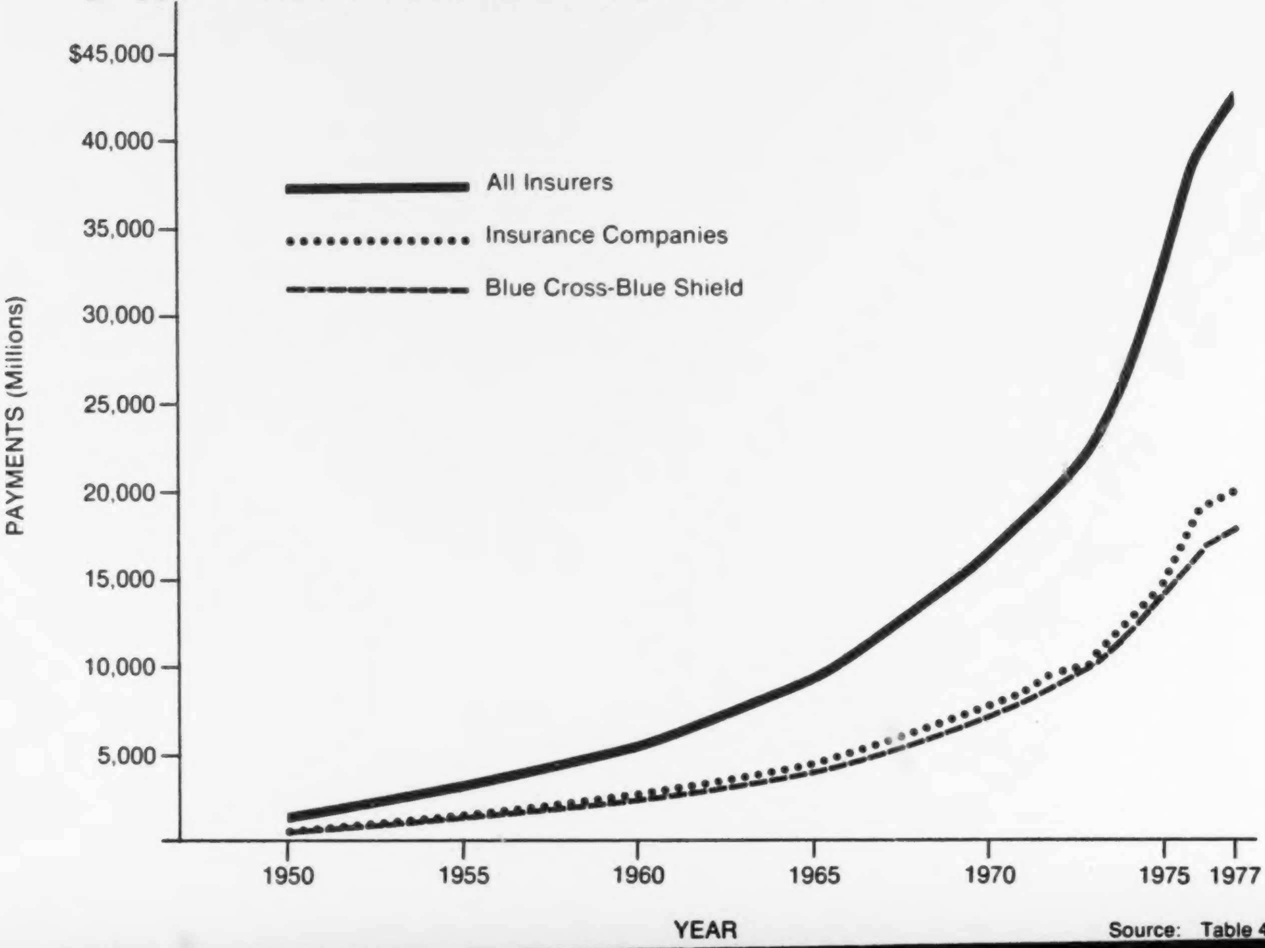
Table 47—Private Health Insurance Benefit Expenditures by Type of Insurer, Selected Years 1950-1977

	Amount (millions)							
		Blue Cross-Blue Shield			All Other Insurance Companies			
Year	All Insurers	Total	Blue Cross	Blue Shield	Total	Group Policies	Individual Policies	Independent Plans
1950	$ 991.9	$ 490.6	$ 382.9	$ 107.7	$ 400.0	$ 257.0	$ 143.0	$ 101.3
1955	2,535.7	1,146.7	832.2	314.5	1,179.0	858.0	321.0	210.0
1960	4,996.3	2,287.1	1,646.2	640.9	2,389.0	1,901.0	488.0	320.2
1965	8,728.9	3,912.9	2,853.4	1,059.5	4,265.0	3,413.0	852.0	551.0
1970	15,743.7	7,060.2	5,009.3	2,050.9	7,656.1	6,510.1	1,146.0	1,027.4
1971	17,713.6	8,178.7	5,906.9	2,271.8	8,341.5	7,067.5	1,274.0	1,193.4
1972	19,432.8	8,990.9	6,501.3	2,489.6	9,123.6	7,757.5	1,366.0	1,318.3
1973	21,911.7	10,004.2	7,187.3	2,816.9	9,962.1	8,405.9	1,556.2	1,945.4
1974	25,871.4	11,639.5	8,311.1	3,328.4	11,659.3	10,125.8	1,533.5	2,572.6
1975	31,917.3	14,192.0	10,075.9	4,116.1	14,525.6	12,956.6	1,569.0	3,199.7
1976	38,418.4	16,226.5	11,624.9	4,601.6	18,365.0	16,633.8	1,731.2	3,826.9
1977	41,594.5	17,626.2	12,473.7	5,152.5	19,514.3	17,591.9	1,922.4	4,454.0

Note: Data for 1973-1977 are preliminary estimates from HCFA surveys.

Source: Carroll, M. S., Arnett, R. H.: Private Health Insurance Plans in 1977: Coverage, Enrollment, and Financial Experience. Health Care Financing Review 1:3-22, Fall 1979.

Figure 22—Private Health Insurance Benefit Expenditures by Type of Insurer, Selected Years 1950-1977



Source: Table 47

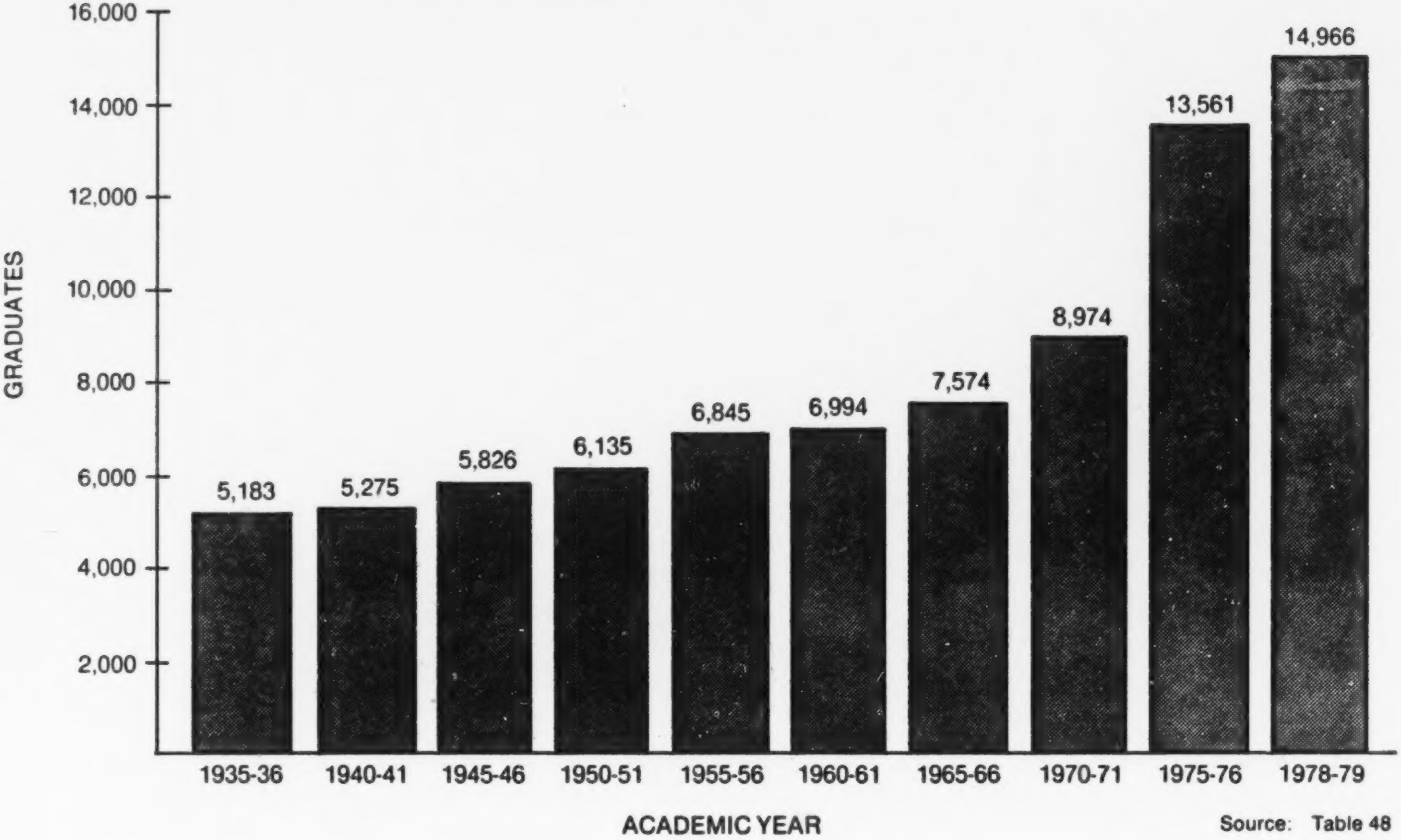
Table 48—Students and Graduates in Medical and Basic Science Schools, Selected Years 1940-1979

		Enrollment			
Year	Number of Schools[a]	Total	First Year	Intermediate Years	Graduates
1940-41	77	21,379	5,837	10,267	5,275
1945-46	77	23,216	6,060	11,330	5,826
1950-51	79	26,186	7,177	12,874	6,135
1955-56	82	28,639	7,686	14,108	6,845
1960-61	86	30,288	8,298	14,996	6,994
1965-66	88	32,835	8,759	16,502	7,574
1967-68	94	34,538	9,479	17,086	7,973
1968-69	99	35,833	9,863	17,911	8,059
1969-70	101	37,669	10,401	18,901	8,367
1970-71	103	40,487	11,348	20,165	8,974
1971-72	108	43,650	12,361	21,738	9,551
1972-73	112	47,546	13,726	23,429	10,391
1973-74	114	50,886	14,185	25,088	11,613
1974-75	114	54,074	14,963	26,397	12,714
1975-76	114	56,244	15,351	27,332	13,561
1976-77	116	58,266	15,667	28,992	13,607
1977-78	122	60,456	16,134	29,929	14,393
1978-79	125	62,754	16,620	31,168	14,966

[a] Prior to 1956-1957, schools in development were not included.

Source: Medical Education in the United States, 1978-1979. JAMA 243:849-866, March 7, 1980.

Figure 23—Medical and Basic Science School Graduates, Selected Academic Years 1935-1979



Source: Table 48

Table 49—Women in U.S. Medical Schools, Selected Years 1949-1979

Academic Year	Women Applicants		Women in Entering Class		Total Women Enrolled		Women Graduates	
	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total
1949-50	1,390	5.7%	387	5.5%	1,806	7.2%	595	10.7%
1959-60	1,026	6.9	494	6.0	1,710	5.7	405	5.7
1964-65	1,731	9.0	786	8.9	2,503	7.7	503	6.8
1969-70	2,289	9.4	952	9.2	3,390	9.0	700	8.4
1970-71	2,734	10.9	1,256	11.1	3,894	9.6	827	9.2
1971-72	3,737	12.8	1,693	13.7	4,755	10.9	860	9.0
1972-73	5,480	15.2	2,315	16.9	6,099	12.8	924	8.9
1973-74	7,202	17.8	2,743	19.6	7,731[a]	15.4[a]	1,264	11.1
1974-75	8,712	20.4	3,260	22.3	9,786	18.1	1,706	13.4
1975-76	9,575	22.6	3,656	23.8	11,527	20.5	2,200	16.2
1976-77	10,244	24.3	3,876	24.7	13,059	22.4	2,611	19.2
1977-78	10,195	25.1	4,149	25.7	14,373	23.8	3,086	21.4
1978-79	9,561	26.1	4,184	25.2	15,293	24.4	3,445	23.0

[a] Harvard did not provide enrollment figures.

Source: Medical Education in the United States, 1978-1979. JAMA 243:849-866, March 7, 1980.

Table 50—Minority Groups and Country of Origin of Foreign Students Enrolled in U.S. Medical Schools, 1972-1973 and 1978-1979

Student Group	1972-1973		1978-1979	
	Number	% of Total Enrollment	Number	% of Total Enrollment
U.S. Minority Groups	3,139	6.6%	7,768	12.4%
Black	2,593	5.5	3,610	5.8
American Indian	68	0.1	195	0.3
Mexican-American	380	0.8	900	1.4
Puerto Rican	98[a]	0.2[a]	904	1.4
Other Hispanic[b]	--	--	485	0.8
Asian or Pacific Islander[b]	--	--	1,674	2.7
Foreign Nationals	715	1.5	830	1.3
Far East	208	0.4	271	0.4
Near and Middle East	35	0.1	39	0.1
Europe	64	0.1	86	0.1
Central America	170	0.4	164	0.3
South America	38	0.1	49	0.1
Africa	112	0.2	124	0.2
Oceania	11	c	13	c
Canada	53	0.1	84	0.1
Other	24	0.1	--	--

[a] Mainland only. University of Puerto Rico excluded from count. [b] Enrollment not reported in 1972-1973.
[c] Less than 0.05%.

Source: Medical Education in the United States, 1972-1973. JAMA 226:898-921, November 19, 1973; 1978-1979 JAMA 243:849-866, March 7, 1980.

Table 51—Distribution of Medical Students by Parental Income and Control of Medical School, 1976-1977

Family Income	All Families		Medical Students					
			All Schools		Public Schools		Private Schools	
	Number[a]	Percent	Number	Percent	Number	Percent	Number	Percent
Total	56,710	100.0%	52,314	100.0%	30,604	100.0%	21,710	100.0%
Under $5,000	5,842	10.3	2,632	5.0	1,511	4.9	1,121	5.2
$5,000-$9,999	11,124	19.6	5,666	10.8	3,528	11.5	2,138	9.8
$10,000-$14,999	11,481	20.2	11,389	21.8	7,249	23.7	4,140	19.1
$15,000-$19,999	10,824	19.1	8,441	16.1	5,265	17.2	3,176	14.6
$20,000 or more	17,437	30.7	24,186	46.2	13,051	42.6	11,135	51.3
Estimated Median	$14,958		$22,000[b]		$21,500[b]		$25,000[b]	

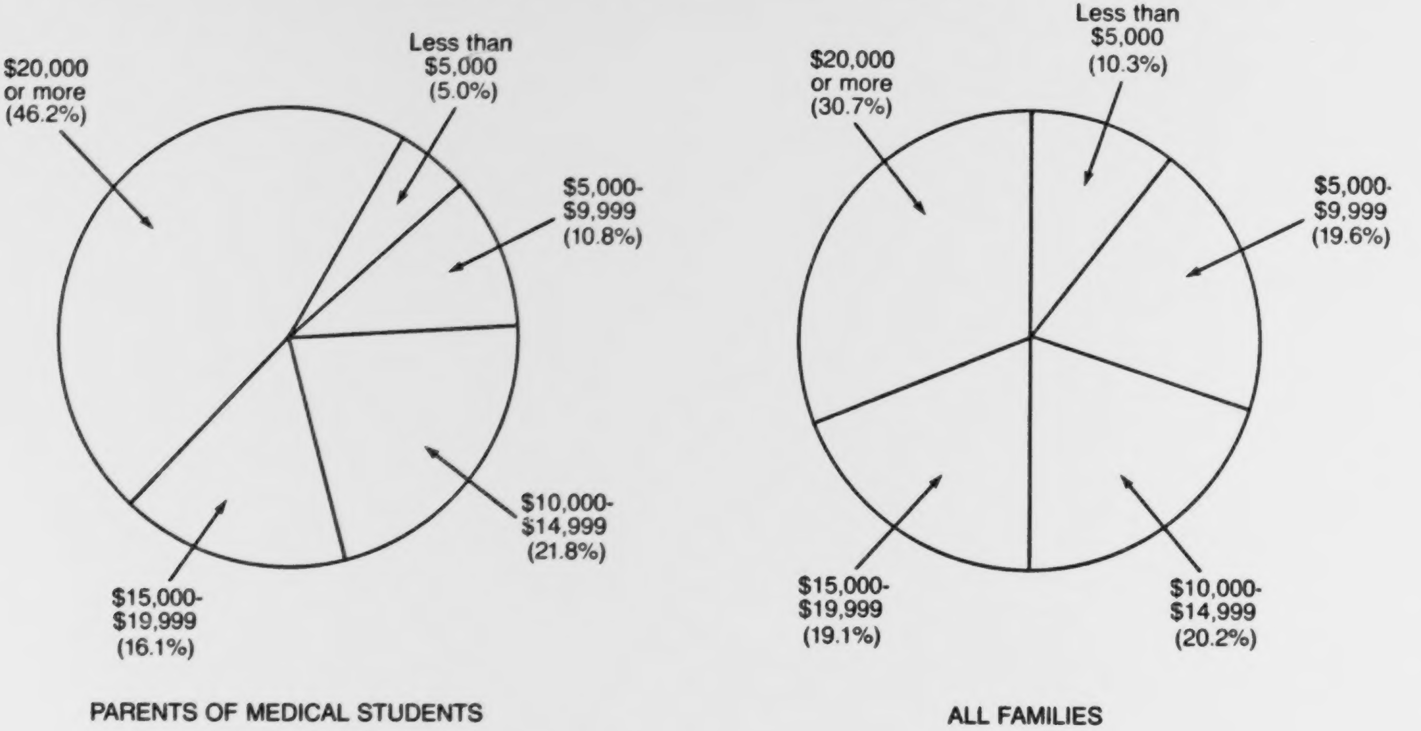
[a] In thousands.

[b] Estimate.

Sources: Dube, W.F.: Descriptive Study of Enrolled Medical Students, 1976-1977. DHEW Publication No. (HRA) 78-80. Hyattsville, Md.: Health Resources Administration, 1978:55.

Money Income in 1976 of Families and Persons in the United States. Current Population Reports Series P-60, No. 114, July 1978:63.

Figure 24—Percentage Distribution of Medical Students by Parental Income Compared to All Families, 1976-1977



PARENTS OF MEDICAL STUDENTS

ALL FAMILIES

Source: Table 51

Table 52—Accredited Residency Programs, Number of Residents, and Program Fill Rates, by Specialty, 1974 and 1979

	1974			1979		
Specialty	Number of Accredited Programs	Number of Residents	Percent Positions Filled	Number of Accredited Programs	Number of Residents	Percent Positions Filled
Total	4,640	52,685	91%	4,630	64,332	93%
Anesthesiology	158	2,044	90	163	2,473	88
Family Practice	230	2,669	80	366	6,420	92
Internal Medicine	425	11,024	97	443	16,531	97
Obstetrics/Gynecology	325	3,421	94	306	4,587	97
Orthopedic Surgery	183	2,375	97	188	2,478	97
Pathology	459	2,835	83	358	2,499	89
Pediatrics	257	4,784	96	253	5,301	94
Psychiatry	256	4,370	87	232	3,934	83
Radiology, Diagnostic	159	718	80	250	2,959	96
Surgery	415	7,354	94	352	7,968	93
All Other	1,773	11,091	89	1,719	9,182	91

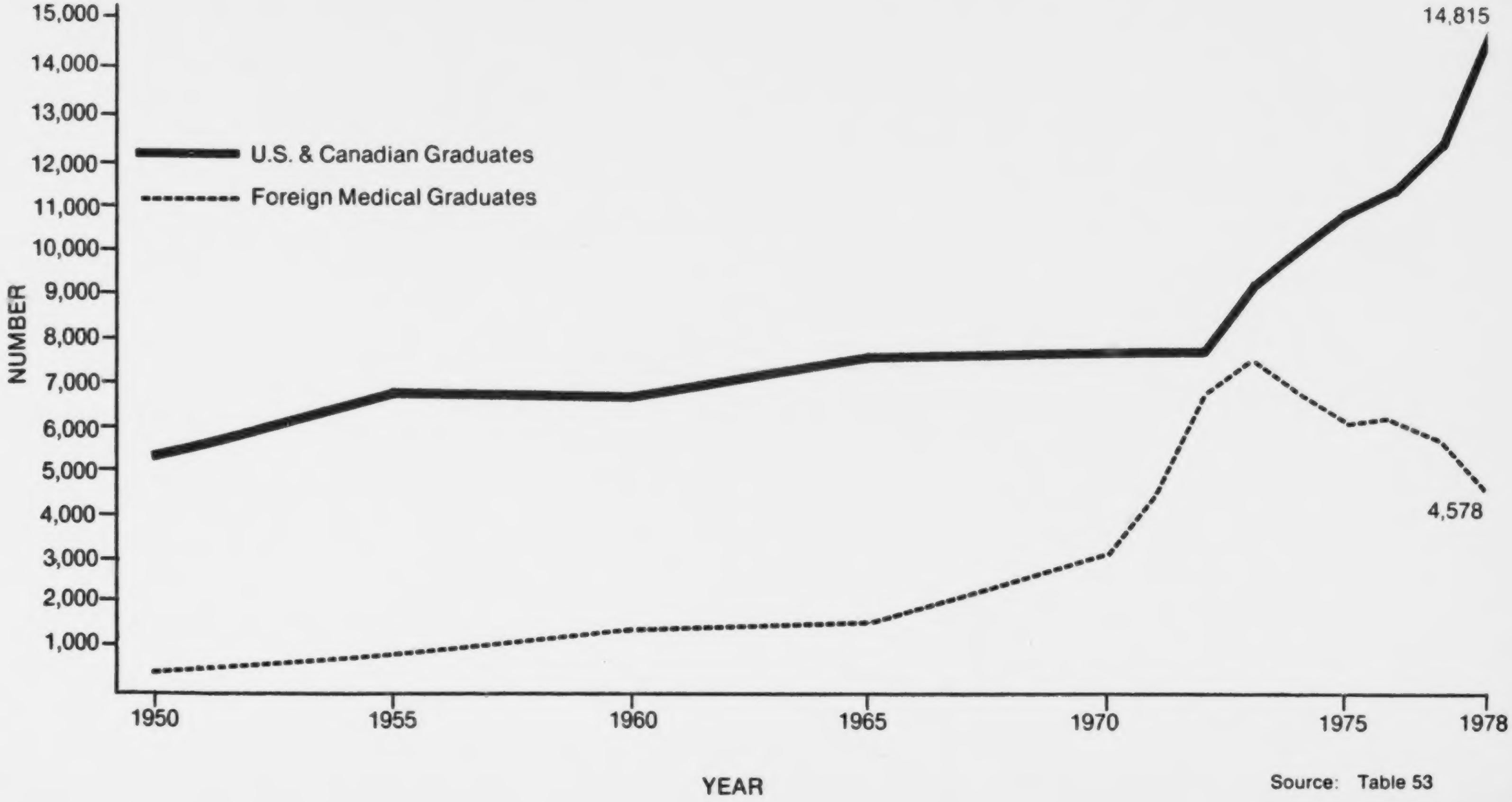
Source: Medical Education in the United States, 1975-1976. JAMA 236:2971-2992, December 27, 1976; 1978-1979, JAMA 243:867-887, March 7, 1980.

Table 53—Total and Foreign Medical Graduate Licentiates Representing Additions to the Medical Profession, Selected Years 1950-1978

Year	All Graduates			Foreign Medical Graduates		
	Total	Examination	Endorsement	Total	Examination	Endorsement
1950	6,002	4,609	1,393	308	267	41
1955	7,737	6,211	1,526	907	881	26
1960	8,030	6,225	1,805	1,419	1,383	36
1965	9,147	5,699	3,448	1,528	1,468	60
1970	11,032	6,729	4,303	3,016	2,830	186
1971	12,257	7,743	4,514	4,314	4,131	183
1972	14,476	9,760	4,716	6,661	6,442	219
1973	16,689	10,752	5,937	7,419	7,247	172
1974	16,706	9,916	6,790	6,613	6,425	188
1975	16,859	8,990	7,869	5,965	5,838	127
1976	17,724	9,598	8,126	6,436	6,330	106
1977	18,175	8,836	9,939	5,851	5,790	61
1978	19,393	8,131	11,262	4,578	4,540	38

Source: Wunderman, L. E.: Physician Distribution and Medical Licensure in the U.S., 1978. Chicago: American Medical Association, 1979:357-358.

Figure 25—Licentiates Representing Additions to the Medical Profession, Selected Years 1950-1978



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